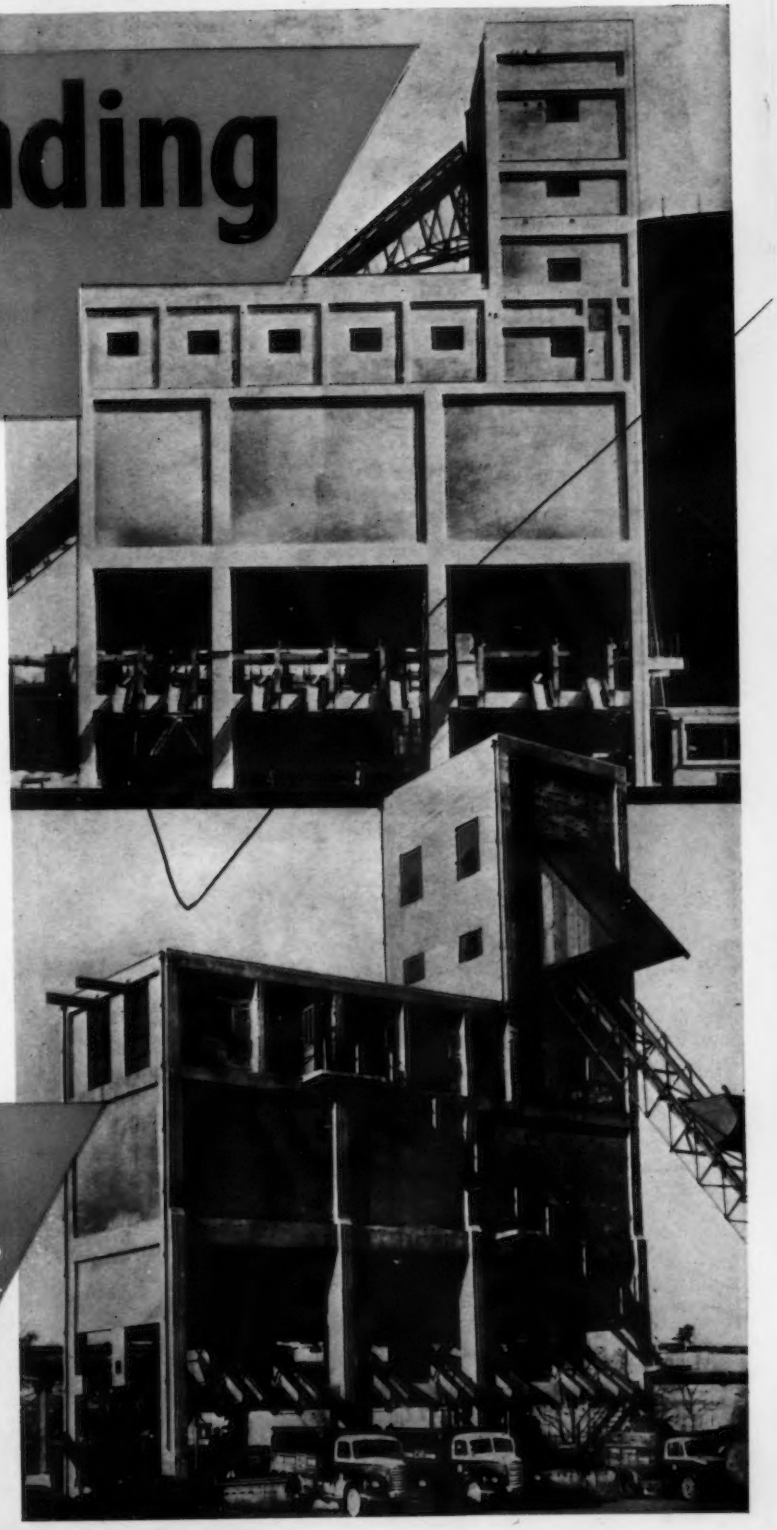
Tech

Gas Journal

VOL. 280. 106TH YEAR. LONDON, OCTOBER 6, 1954 NO. 4766. PRICE 1/3

Coke Grading Plant

The policy of the Gas Council and Area Boards for the production, preparation and marketing of quality coke has been the consistent aim of our Company since its inception. The two plants illustrated, Barrow (upper) and Harrogate (lower), show our continuing collaboration in this policy.



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Protection in Gas Production

Humidine
non-setting paint

Used by

Almost every major gas undertaking in the U.K.

Used on

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Used because

One coat forms an impenetrable permanent barrier against corrosion.

Humidine never dries — therefore it never cracks or needs renewal. Impervious to moisture—can be applied under water.

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FOR USE WITH STATION GOVERNORS

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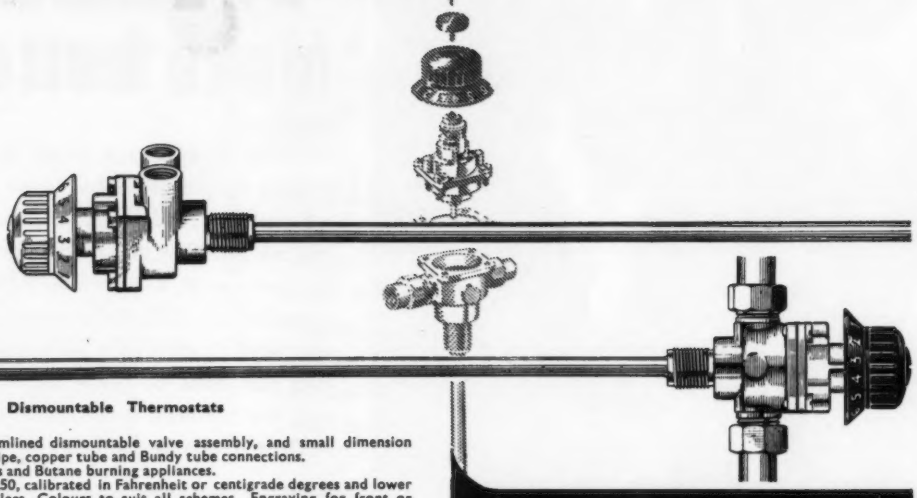
Tech

DOMESTIC DISMOUNTABLE THERMOSTATS



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Interchangeable models for coal gas and Butane burning appliances.
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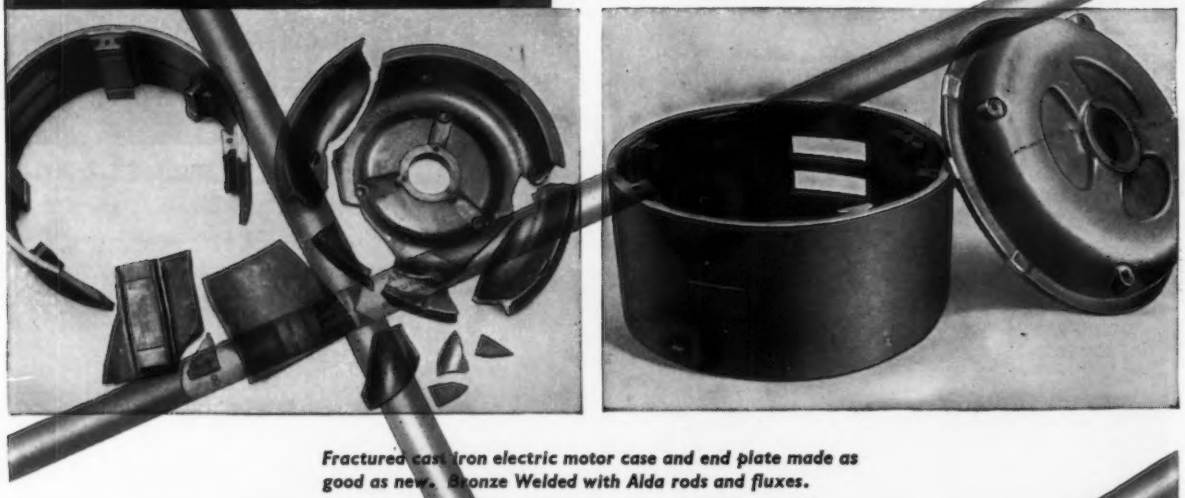
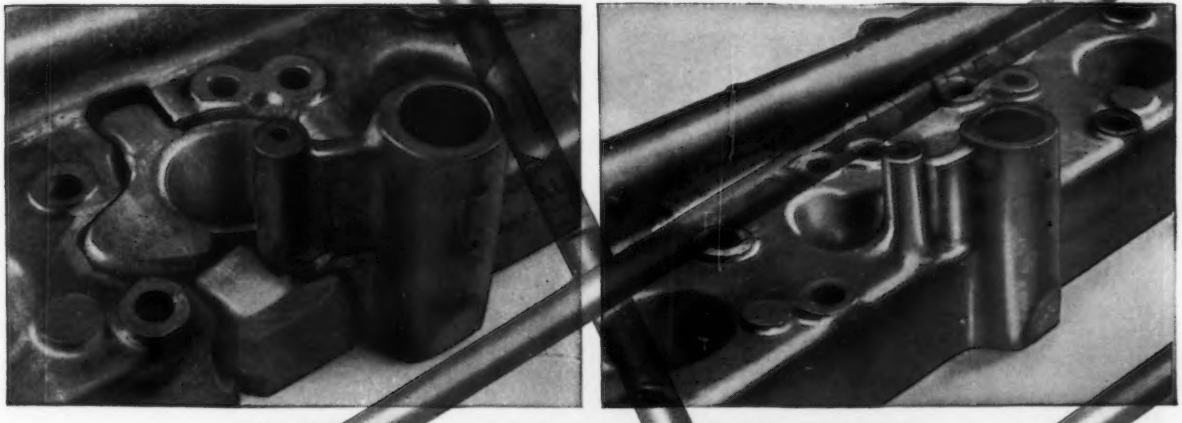
Much of the advantage gained by the use of high quality welding equipment can be thrown away—unless you also use top-grade rods and fluxes. ALDA rods and fluxes are the finest you can get. They include only those materials prepared to the formulæ of B.O.C metallurgists—those proved by repeated tests to fulfil their specific purpose. All consignments are analysed before issue. As a result, you can bank on ALDA rods and fluxes for better welds, made more quickly, and with the minimum consumption of essential materials. Use ALDA rods and fluxes—and get efficiency and economy, too.



Fractured cast iron electric motor case and end plate made as good as new. Bronze Welded with Alda rods and fluxes.



A fractured aluminium cylinder head before and after repair with Alda rods and fluxes. At left, the casting is shown prepared for welding, and at right, the finished job — as good as new.

and Fluxes at lower cost

BRONZE WELDING
FUSION WELDING
LEAD WELDING

all done in less time, using less material

We will gladly send you a copy of our comprehensive **Welding Guide and ALDA Data Sheet.** *It provides a list of 54 different rods and 21 different fluxes with full details of their applications and characteristics, as well as six different methods of removing flux residue, according to the types of metal involved.*

This cast-iron binder attachment is being repaired by welding a lug on to the arm. The Blowpipe is the B.O.C high pressure type CH, the rod an Alda Cast Iron Super Silicon, and the flux Alda cast iron.

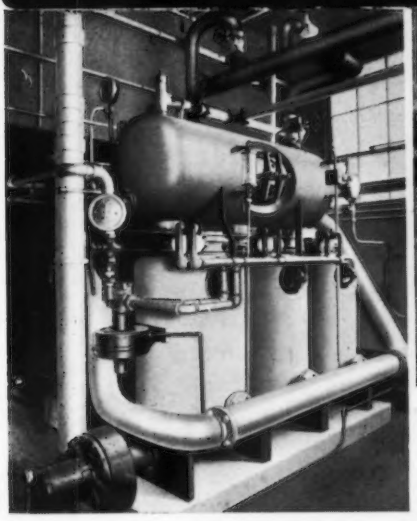
Gas welding is widely used for repair and reconditioning in the automobile industry — for aluminium and sheet steel bodies as well as aluminium and cast iron engine parts. Here, a shattered wing is being made good, using an Alda mild steel copper coated welding rod.

BOC

THE BRITISH OXYGEN CO LTD

LONDON AND BRANCHES

THE "VESTA" & "VERTEX" GAS FIRED BOILERS



Photographs by Courtesy of Wembley Stadium, Ltd

Consulting Engineers: Sir Owen Williams & Partners
Heating Specialists: James Combe & Son Ltd.

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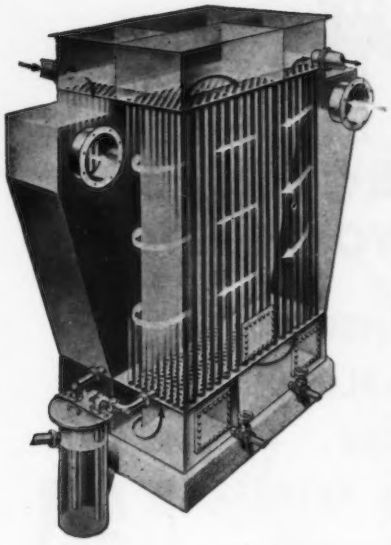
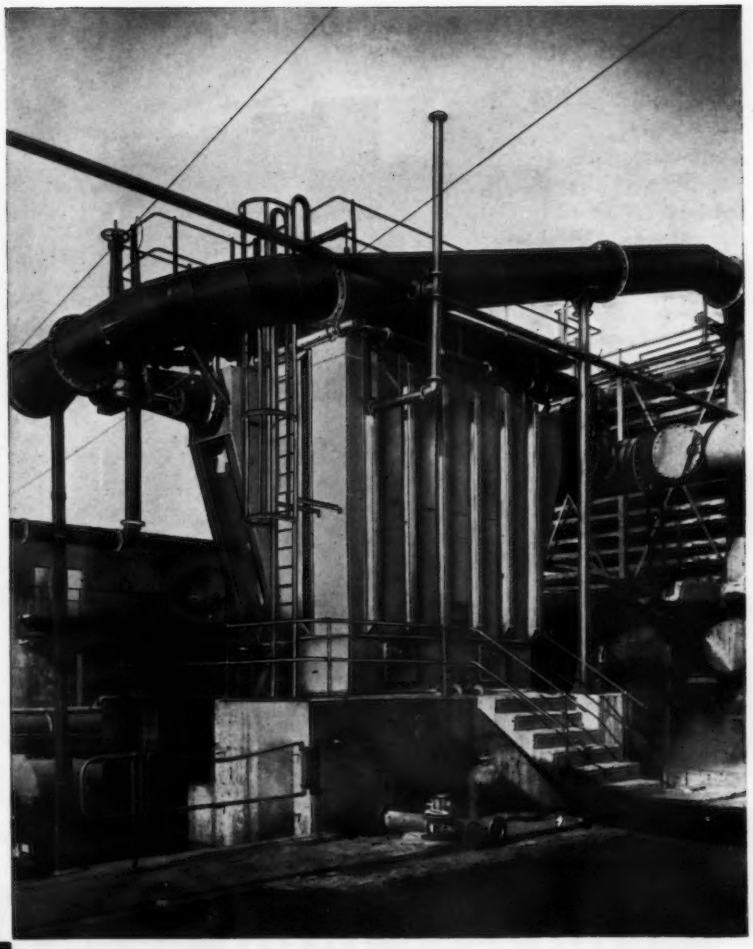


THE WHESSOE CROSS-FLOW CONDENSER

THE Whessoe Cross-Flow Condenser, a new and efficient unit for cooling gas, is now in operation. The first to be commissioned was built for Consett Iron Co. Ltd. Design capacity was 8.0 million cubic feet of Coke Oven Gas per day. Other units of this type have been supplied to Area Gas Boards.



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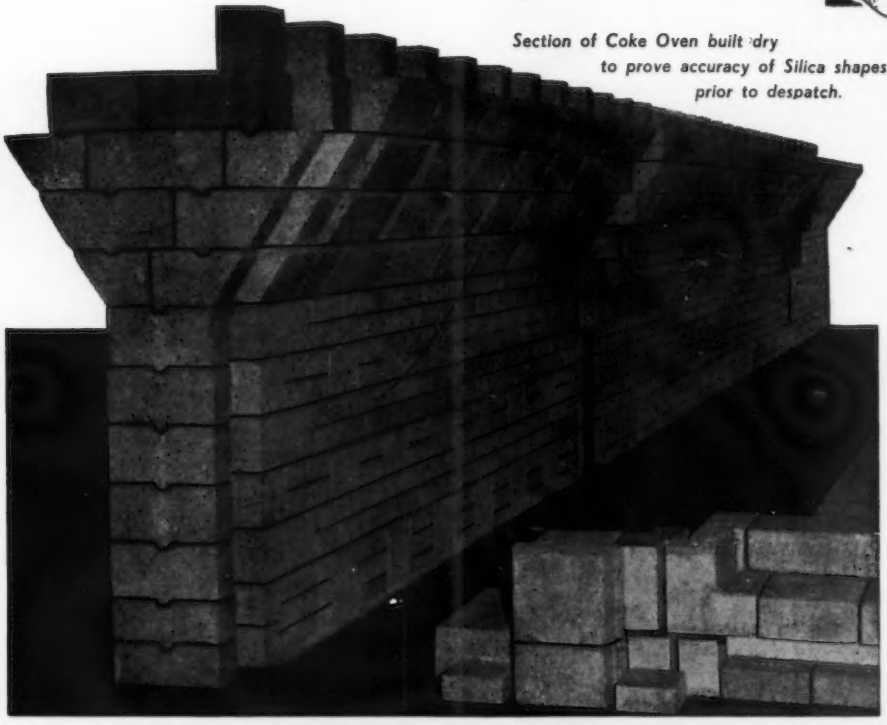

Section of Coke Oven built dry to prove accuracy of Silica shapes prior to despatch.

IT PAYS TO USE CONSETT REFRACTORIES

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SPECIAL VALVES DESIGNED if required
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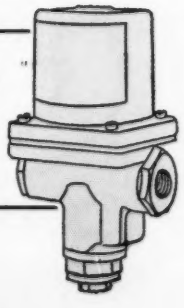
THE MAGNETIC 'R' TYPE SINGLE BEAT STOP VALVE

The standard valve can be supplied in ¼", ⅜", ½", ¾" and 1" sizes, fitted with Full-way orifice, suitable for controlling the flow of Coal Gas or similar medium at pressures up to 10" W.G., although where necessary this type of unit can be supplied suitable for use with pressures in excess of this.
The valve is instantaneous in operation, of "packless" construction, and can be fitted with continuously rated A.C. or D.C. operating coils as required. Furthermore, the standard unit is adaptable to either straight or angle pattern.
A similar type of valve can be supplied suitable for controlling the flow of Water, Air, Oil or Refrigerants, etc.



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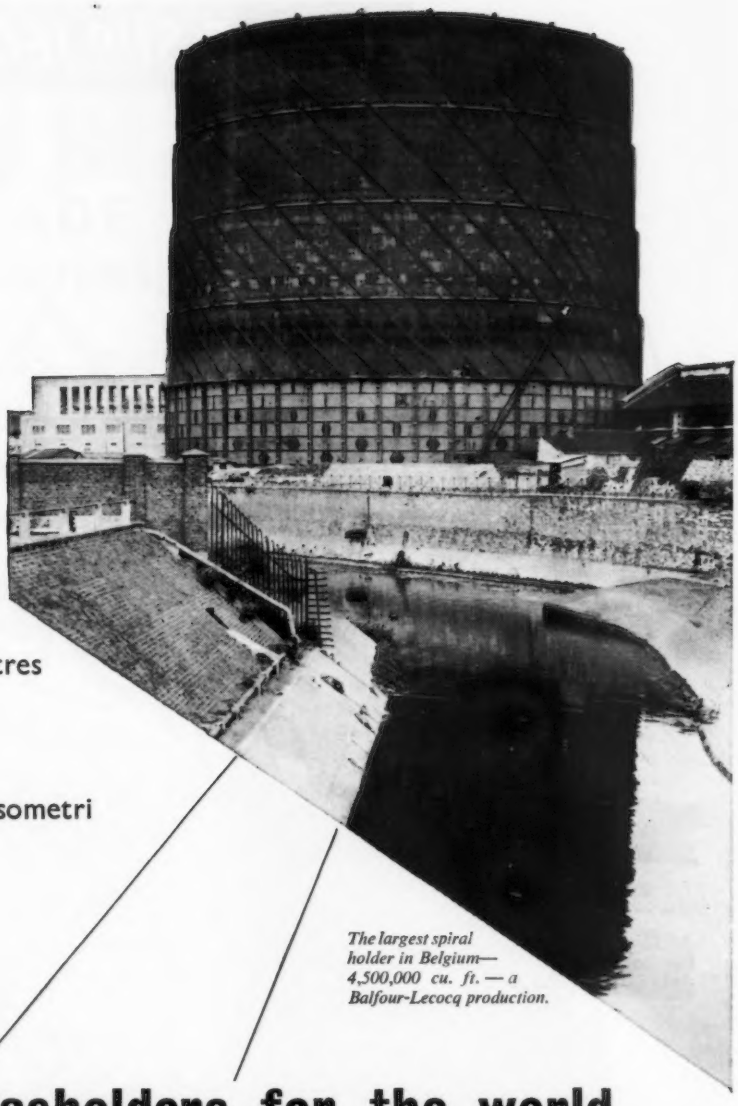

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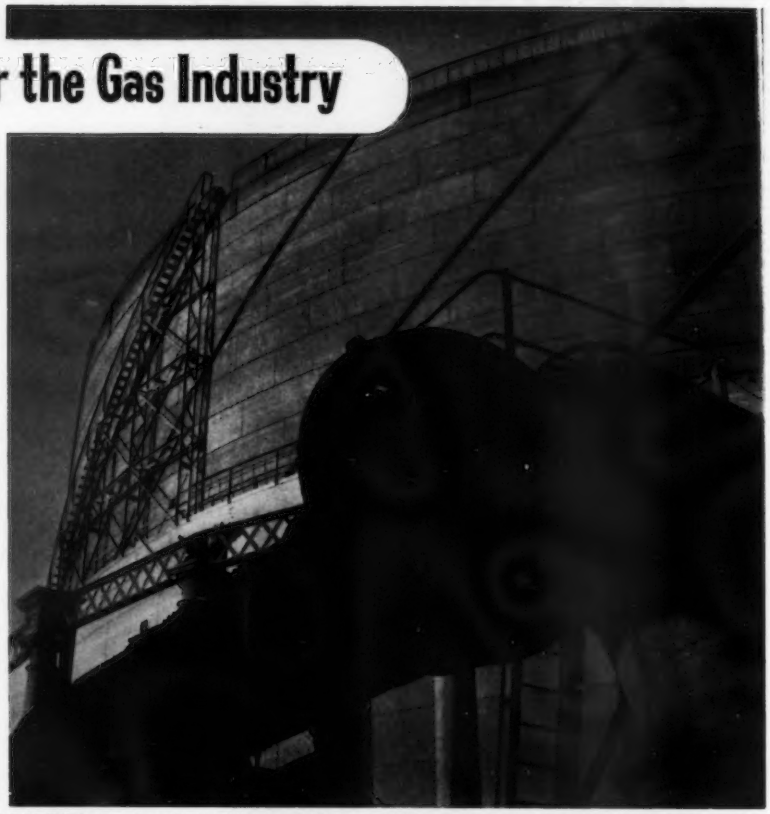

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Represents the latest and greatest advances in the protection of iron and steel subject to very high temperatures. "LUMEROS X" gives adequate protection at temperatures up to 600°C. Good water resistance. No undercoat required. Available in Aluminium or Black.

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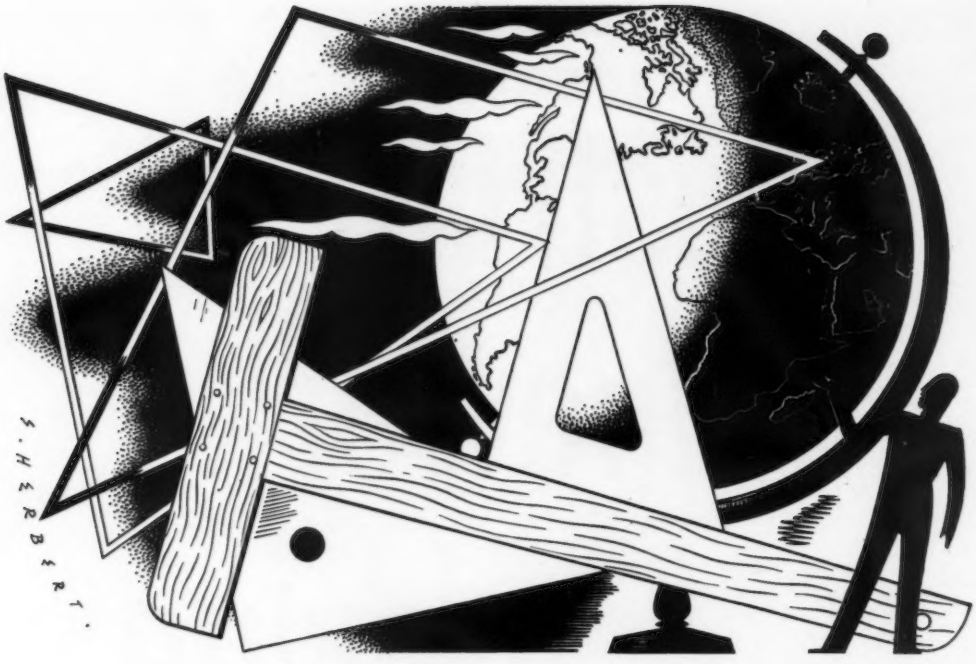

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Cutting down commenced

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First delivery site materials

23rd AUGUST

Work completed; Tank started filling.

4th September TESTED and PASSED

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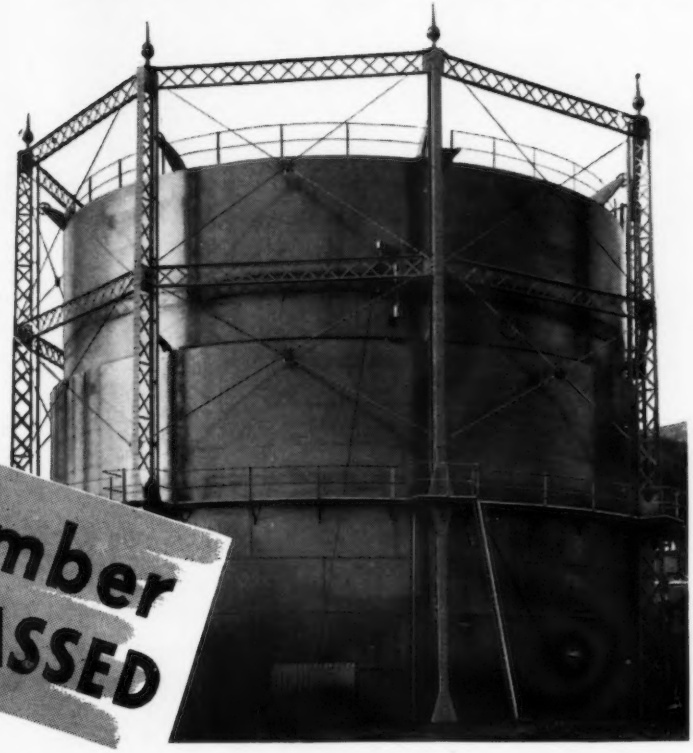

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Specification

Inner Lift	*58' 3" dia. x 18' 0" dp.*
Outer Lift	*61' 0" dia. x 18' 0" dp.*
Steel Tank	*63' 0" dia. x 18' 0" dp. to top of rest blocks.*

Pressure when fully inflated 8.3" W.G.
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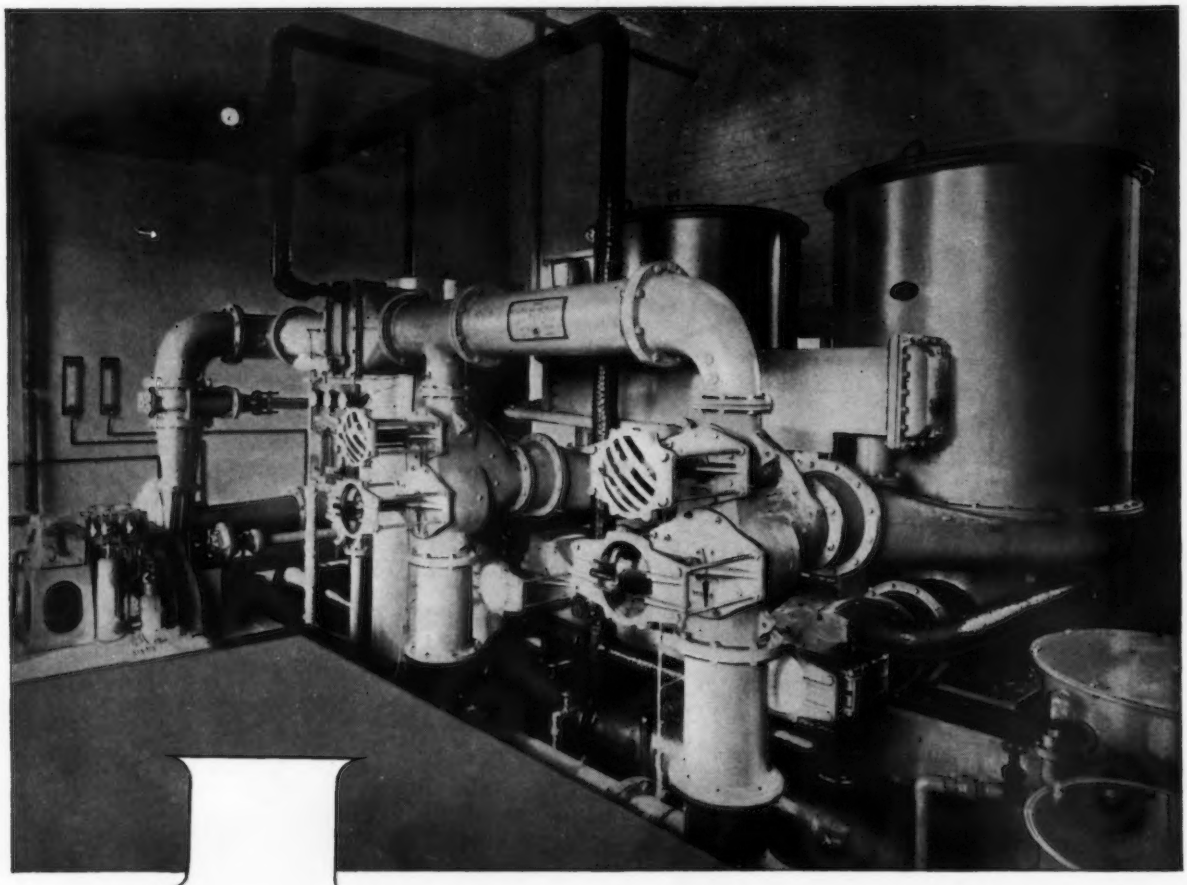

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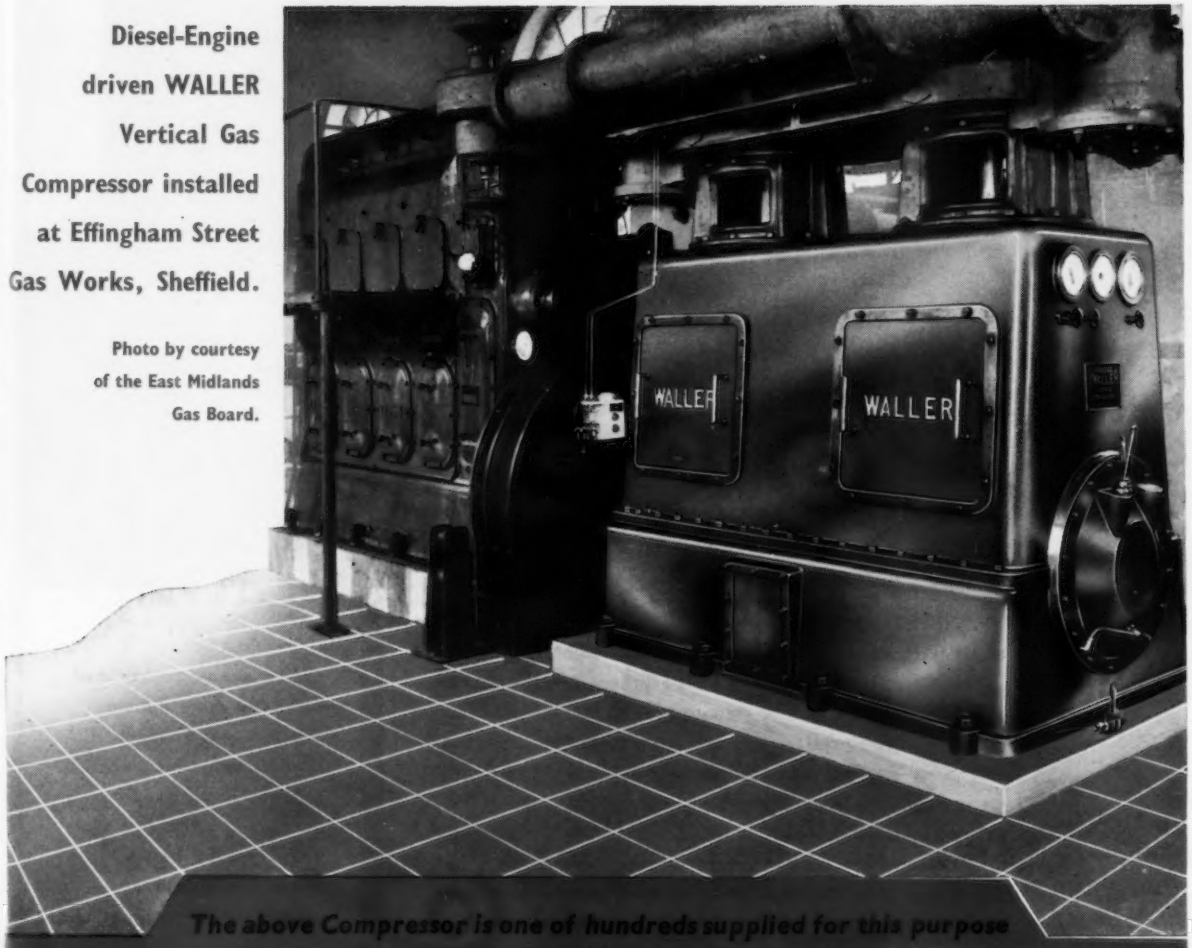
Diesel-Engine driven WALLER Vertical Gas Compressor installed at Effingham Street Gas Works, Sheffield.

Photo by courtesy of the East Midlands Gas Board.



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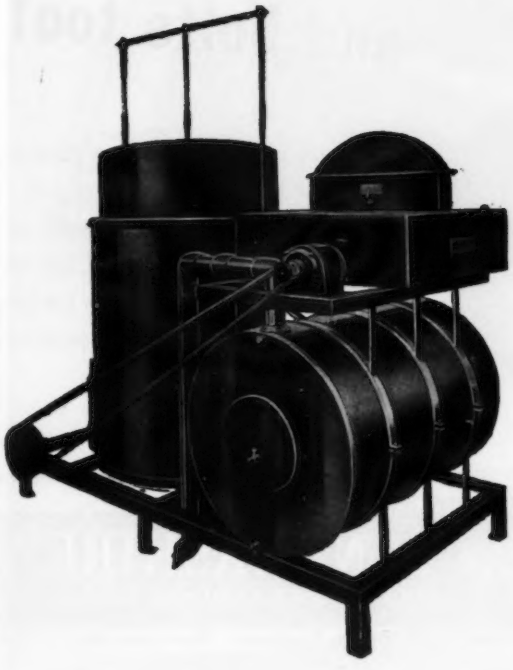

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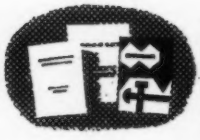

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It is water, weather, and fireproof, and has great mechanical strength and hardness. Its adhesion to concrete is greater than the strength of the concrete itself.

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Photograph by HAYWARD SMEAD, *"Coal" Magazine.*

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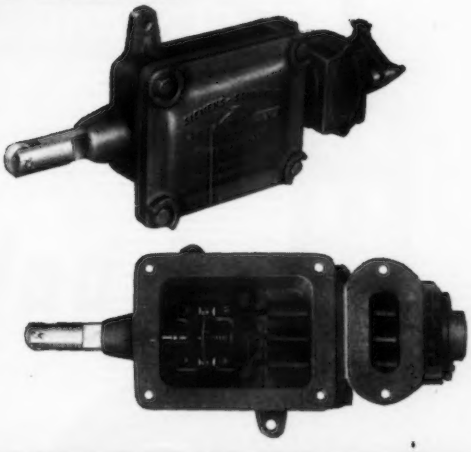

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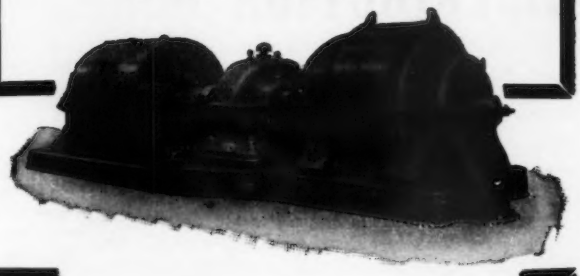

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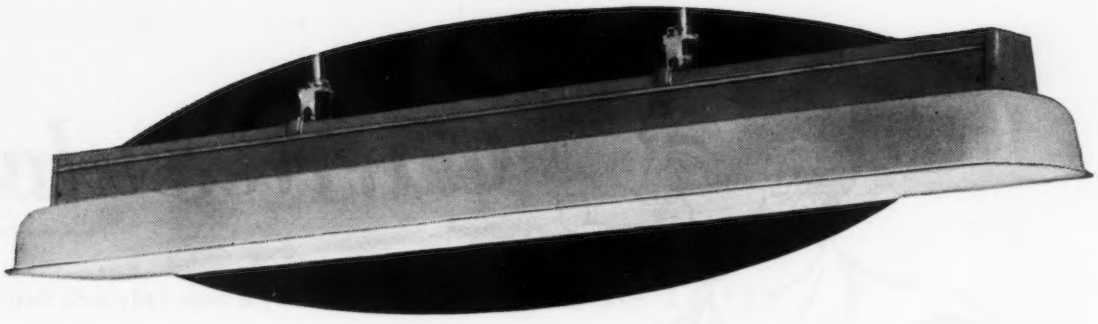

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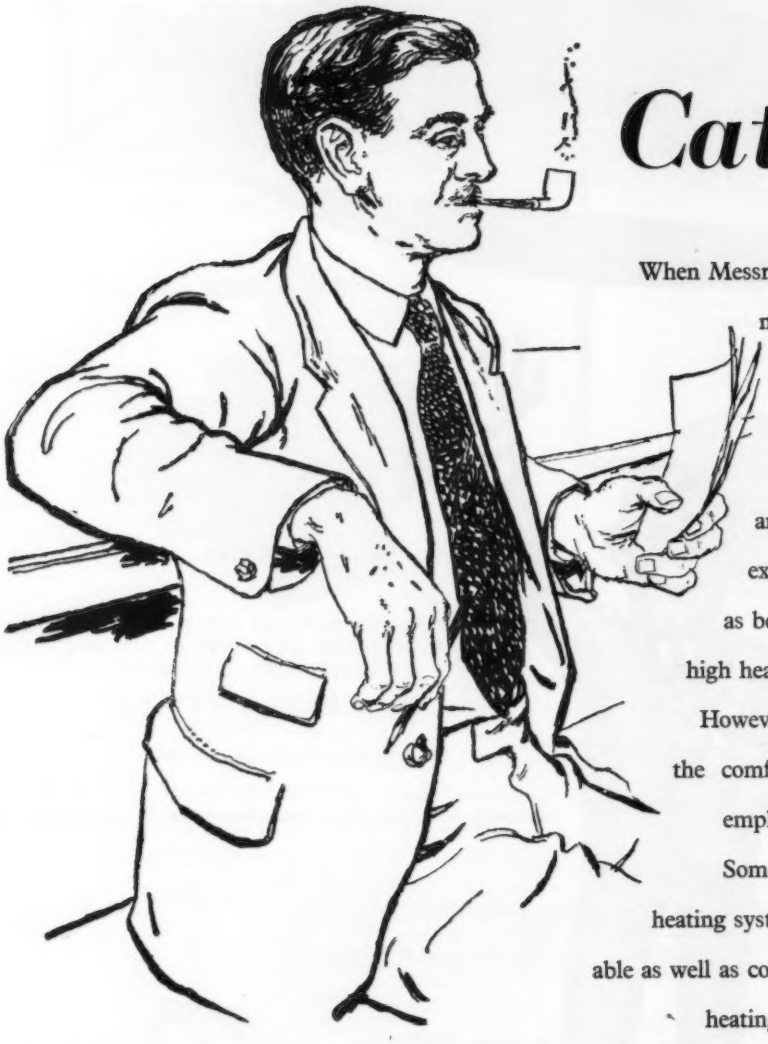


Cattle sales

When Messrs. Manley & Sons Ltd., built their fine new premises at Crewe they determined to ensure the comfort of visiting buyers. The café and lounge were of a standard to equal a first class hotel, and heating arrangements were installed, except for the sales ring. This was regarded as being practically unheatable because of its high heat losses from constantly opening doors. However, when the new building was opened, the comfort of the rest of the premises only emphasised the discomfort of the sales ring. Something had to be done. Various types of heating systems were considered but found unsuitable as well as costly. Messrs. A. Bebbington & Son, the heating contractors, consulted the Manchester office of De La Rue. 15 Industrial type De La Rue infra red heaters were installed, and now the sales ring is as comfortable as the rest of the building.

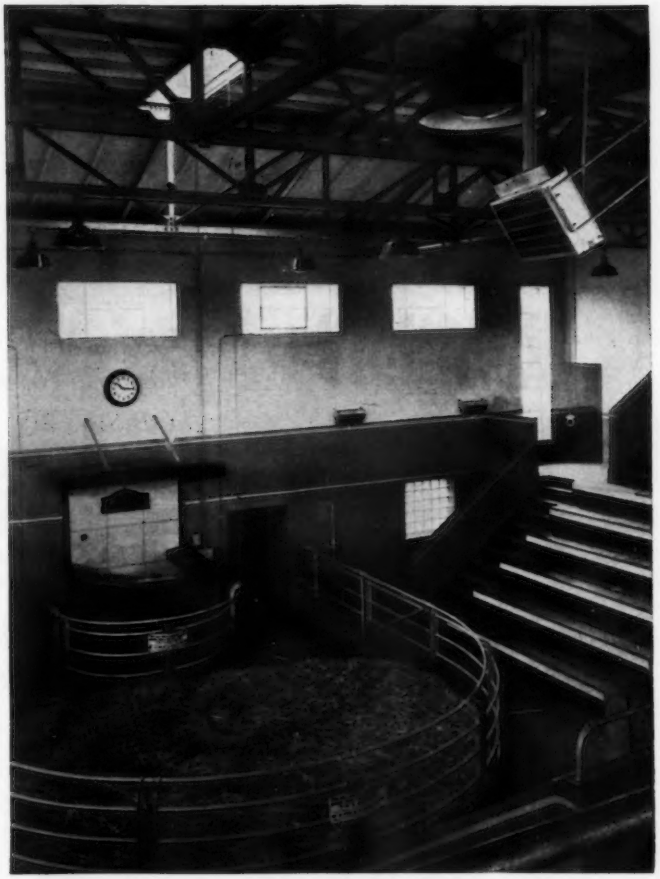
THE PROBLEM

There were many difficulties to be overcome in this installation. Exposed pipework had to be kept to a minimum. The selected system had to be economical to instal and operate, bearing in mind that heating was required only for two or three days a week. Heat losses were high, both through the structure and due to excessive air change from doors opening several hundreds of times for cattle to enter and leave the Sales Ring.

can be cosy

WHY THEY CHOSE DE LA RUE

De La Rue heaters filled the bill because they emit *radiant* heat; the infra red rays they cast warm only people and solid objects, without wasting heat on the intervening air. This means that the high heat losses could be ignored. This also meant that utmost economy in running costs could be achieved, for the panels need no lengthy 'warming up' period. Indeed, they are turned on for a short period before the sale begins, and turned off immediately it is over. They can frequently be turned down after the initial heating-up—a further economy.



(Photograph by courtesy of Manley & Sons Ltd., Crewe. Installation by A. Bebbington & Son, Crewe.)

OUTSTANDING FEATURES

De La Rue infra red heaters are gas-fired, non-luminous panels. Each is a self-contained unit, complete with lever cock and chain control, permanent pilot and gas pressure governor. They are very easy to instal, require no floor space and, once fitted, need next to no maintenance. There is no risk of frost damage during severe weather.

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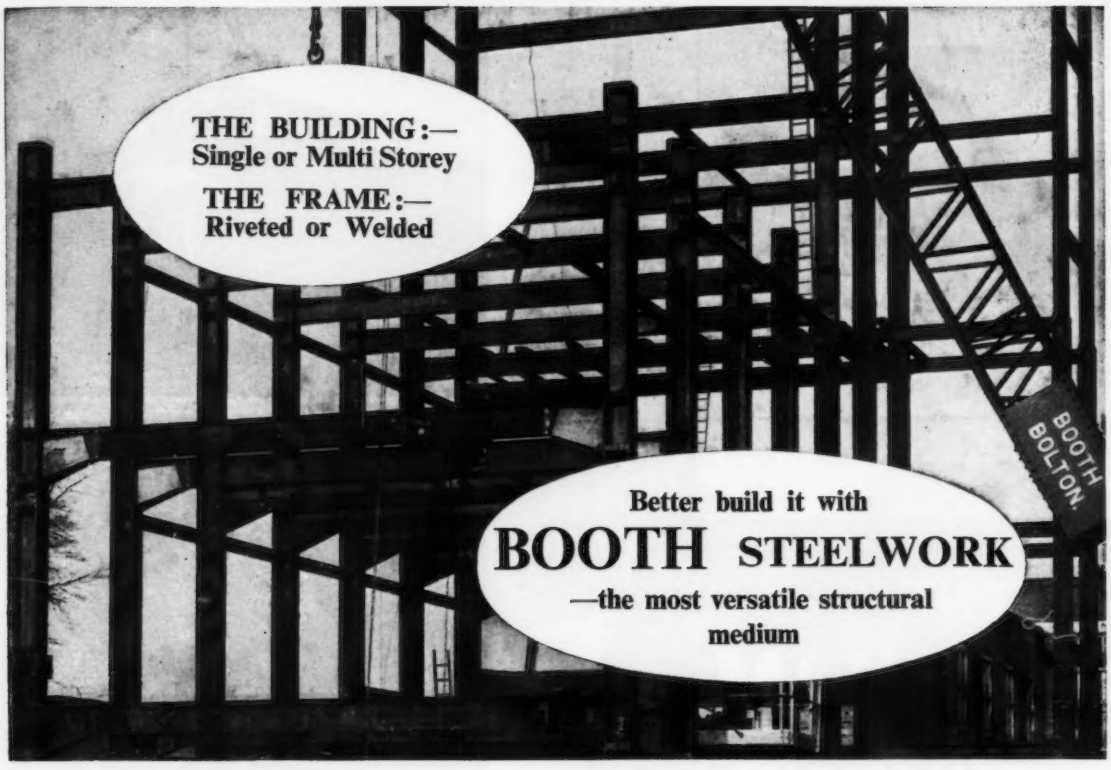

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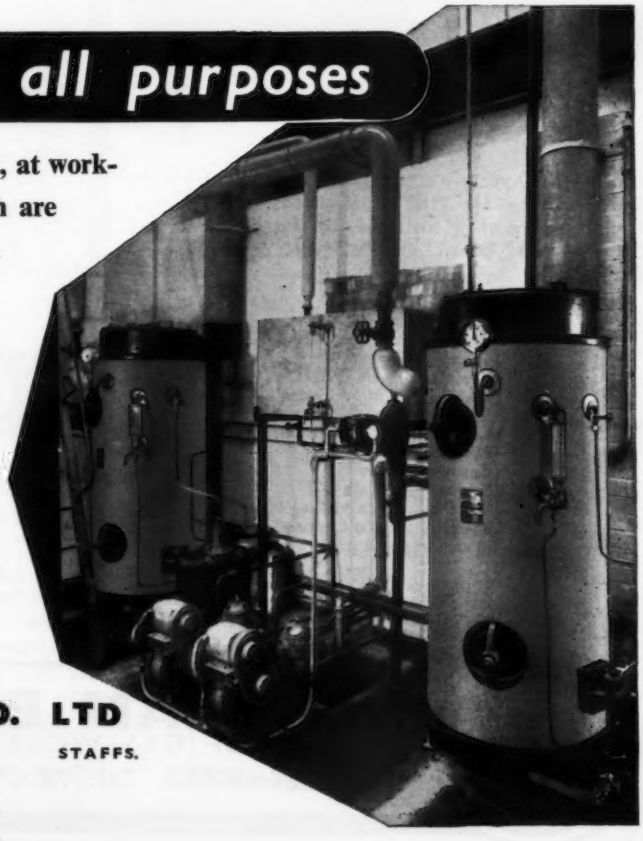

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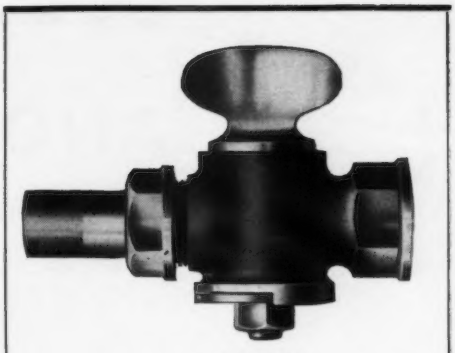

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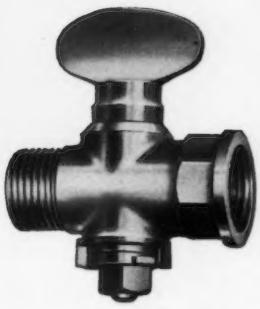

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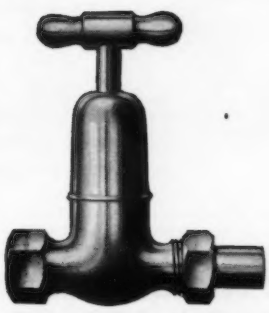

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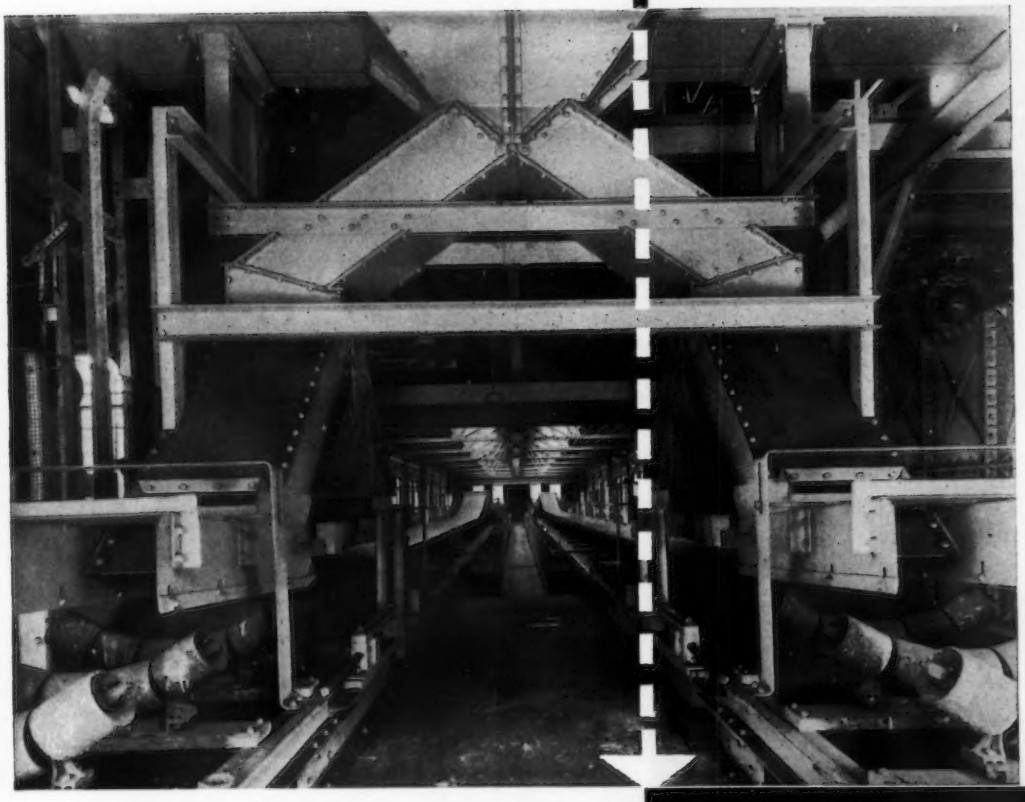

Wigan Overhead Coal Belt Conveyors. Photograph by courtesy of The North Western Gas Board and Drakes Ltd. of Halifax.

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NEW APPROACH TO WAGON HANDLING

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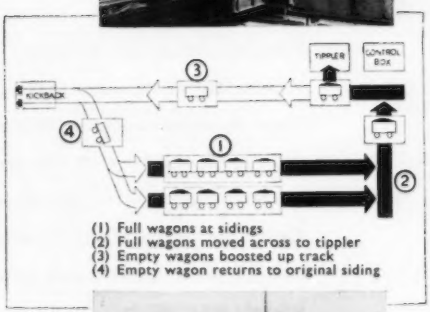
How many men work on your coal sidings? How many locomotives or capstans? What space is wasted by sprawling tracks? How much tonnage can you handle per hour?

The generally unsatisfactory answers given to such questions as these inspired the design of the Mitchell system of wagon handling—a mechanical, electrically-controlled system that offers remarkable scope for increased efficiency at power stations, collieries, coal preparation plants, steelworks, etc., and other centres of industry possessing marshalling yards.

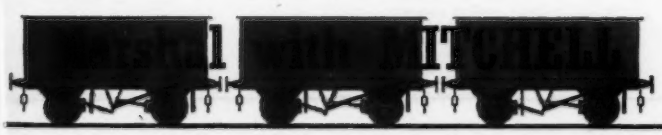
The Mitchell system can be operated by two men. It takes wagons from the arrival sidings, loads or unloads them, weighs them and remarshals ready for departure. Wagons can be emptied and returned to the same siding they arrived at "full" so that one track is used for full and empty wagons. No internal shunting, no additional motive units, no man-handling other than initial uncoupling and final recoupling, are required. The system has no limit to size or capacity and can easily handle the 1000 tons or more of coal per hour which is now being called for. And it does it with the highest degree of safety, in all weathers, round the clock if needs be.

By demanding no more than half the space occupied by traditional balloon sidings, the Mitchell system makes possible the erection of new plant on sites hitherto unsuitable, with very large savings in initial and later costs. Its flexibility makes it adaptable to any individual handling problem. Installations are already at work for the National Coal Board and the British Electricity Authority. The thoroughgoing efficiency and economy of the Mitchell system puts it far in advance of any traditional method and establishes it as the system of the future.



(1) Full wagons at sidings
(2) Full wagons moved across to tippler
(3) Empty wagons boosted up track
(4) Empty wagon returns to original siding

An installation at the British Electricity Authority, Freemens Meadows, Leicester, handling 800 tons of coal an hour. The site is limited in area and normal methods of working with balloon sidings would be impractical. The pictures show the traverser pulling an incoming truck on to the transfer rail and an emptied wagon being returned to the siding by the 'kickback'.



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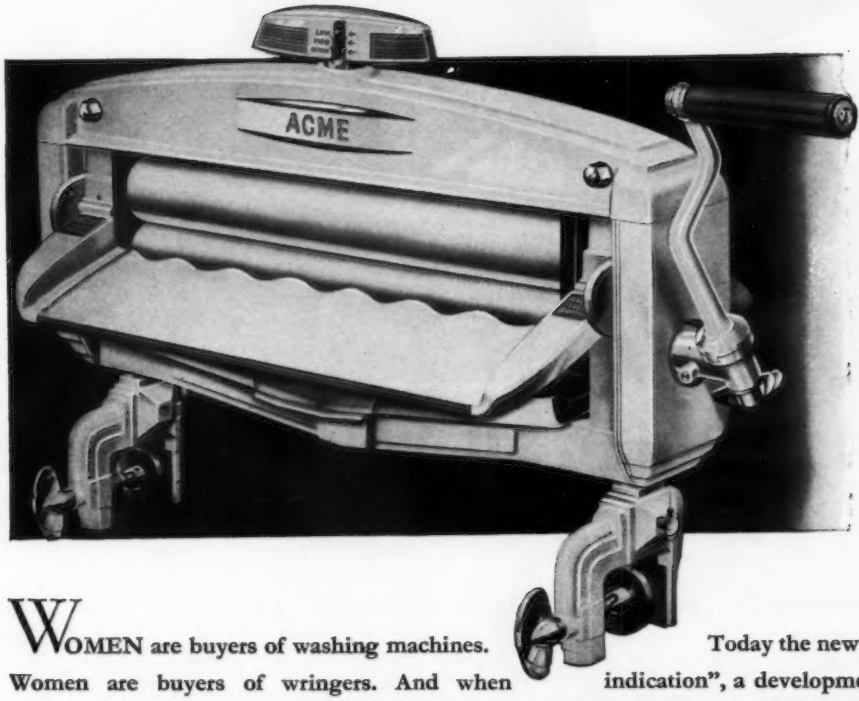

WOMEN are buyers of washing machines. Women are buyers of wringers. And when women think of wringers they think of the Acme. So when your machines are Acme-fitted your customers know that they must be, like the Acme, the best on the market.

Seventy years of good, solid British manufacturing, skill, research, and experience stand behind each Acme—and generations of women know this to be true. Acme is the perfect expression of real and continuous progress in the history of wringing. Thus, every feature for which Acme is famous, has sprung from a known need; has been tested, tried and found successful before it leaves the factory.

Today the new Acme has "pressure indication", a development which, by assuring the correct pressure for every kind of fabric, takes the guesswork out of wringing. Silks, cottons, woollens, linens, now receive exactly the right pressure needed to extract water, expel embedded dirt and preserve the life of each fabric. Thus wringing is made simpler and easier.

Acme does a better job, lasts longer and gives the best results. That's why Acme's reputation is world wide. That's why more than four million women have chosen an Acme in preference to all others. That's why, when your washing machines are Acme-fitted, women know they're buying the best.

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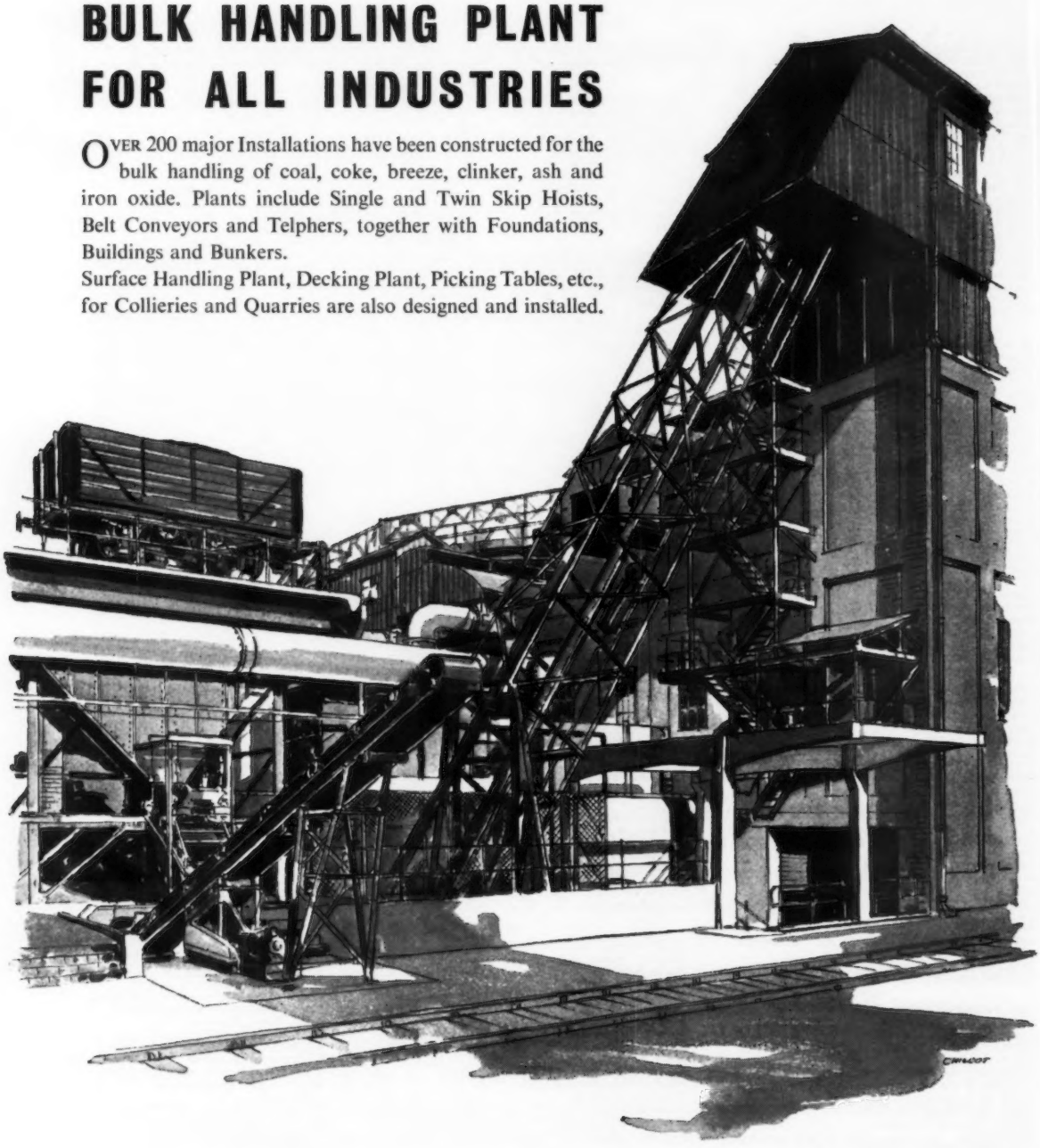

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Gas Journal

VOL. 280 NO. 4766 October 6, 1954
106th YEAR

Managing Director: Clifford A. King

Editor: Trevor G. Williams, A.M.I.Mech.E., Assoc.Inst.GasE., M.Inst.F.
Deputy Editor: Arthur C. Cross

11, BOLT COURT, FLEET ST., LONDON, E.C.4. Telephone : CENtral 2236-7 Telegrams : Gasking, Fleet.

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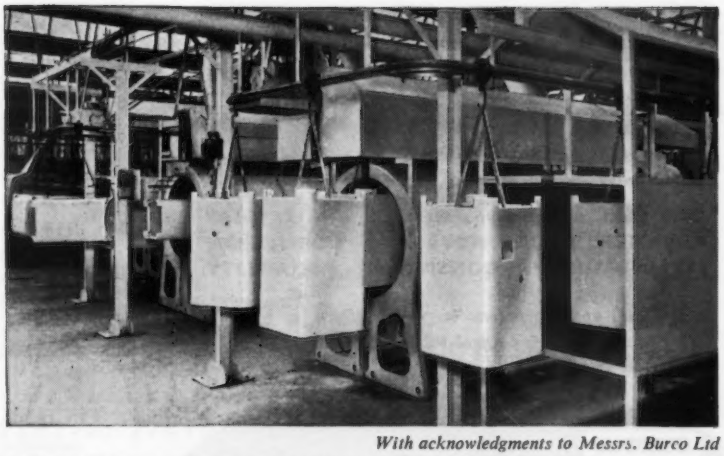

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Gas Journal

VOL. 280. No. 4766 106TH YEAR October 6, 1954

THE ELECTRICITY INDUSTRY

Soon we shall be reviewing the fifth annual reports of the Gas Council and the area boards. By way of prologue we have just had the sixth annual report of the British Electricity Authority (electricity was nationalised a year earlier than gas), which records general expansion on all fronts. Total income was £325.6 mill. in 1953-54 against £290.6 mill. in 1952-53; total expenditure was £277.8 mill. against £254.4 mill.; trading surplus £47.8 mill. against £36.2 mill.; and consolidated net surplus £13.2 mill. against £7.3 mill. Even more imposing than the financial results are the details of production, consumption, and consumers. Over 66,000 mill. units of electricity—7.3% more than in the previous year—were generated in the Authority's power stations. The number of consumers increased by over 529,500 (3.8%) to 14,383,714 at the end of the year. Sales of electricity to consumers increased by 6.9% to a total of 55,846 mill. units. Roughly half the sales were to industry, a third to domestic consumers, and a seventh to commercial consumers. Industrial consumption was 9.8% more than in the previous year; domestic 2.9% more, and commercial 5.8% more. Farm sales were up by 15.8%, public lighting by 7.4%, and railway traction by 2.4%, but street traction sales, as a result of the scrapping of tramways, were 4.5% less.

Taking a longer look back to vesting date in 1948 we see that in the six years the number of consumers has increased by 2,670,000 (almost 23%) and annual sales of electricity to consumers have increased by over 57%. The average price received for electricity was 1.373d. per unit. This was 4.7% above the 1952-53 average, 21.2% above that of the pre-vesting year 1947-48, and 30.1% above that of 1937-38. Like the gas industry, the electricity industry rightly claims that the average price increase since before the war is very much less than the price increases for practically all other commodities and services, and far below the increases borne by the Authority and area electricity boards for plant and equipment, civil engineering works, buildings, coal, materials, and goods of many kinds, and services.

New generating plant with an output capacity of 1.4 mill. kW was brought into service during the year, bringing total capacity to 18.6 mill. kW. The report says more new plant would have been brought into operation but for the delays which the programme suffered at an earlier stage from shortages of steel and other materials.

The Authority plans to increase generating capacity by over 50% during the six years 1954 to 1959. This represents a net addition of some 8,600,000 kW of output capacity, from nearly 16,900,000 kW at the end of 1953 to 25,500,000 at the end of 1959; some 9,800,000 kW of new plant will be provided, and some 1,200,000 kW of old plant will be shut down to make way for new plant or because it is no longer usable. Power station capital contracts approved by the Authority during the year amounted to £93 mill., as compared with £96 mill. in 1952-53 and £89 mill. in 1951-52. At the end of the year 35 new power stations and 57 extensions of power stations, with an aggregate installed capacity of over 11,100,000 kW, were under construction or planned in the plant programmes to the end of 1959. Although the rate of installation of new plant in 1952 and 1953 was the highest recorded, the total amount of post-war plant installed by the end of 1953 was below that originally planned. Some 1,456,000 kW (sent out) of new plant programmed for the years 1948-53 had still to be brought into commission. This, however, was an improvement of 1,149,000 kW on the position at the end of 1952, when 2,605,000 kW from the 1948-52 programmes were outstanding. The arrears were due to post-war economic conditions which restricted the amount of new plant available to the electricity supply industry and seriously delayed the construction of power stations.

At a Press conference preceding the issue of the report Lord Citrine said that with reasonable luck the industry should be able to avoid actual power cuts this winter, but some voltage reductions would still be necessary. It seemed likely, he said, that while large generating units driven by nuclear power would be brought into use within the next 10 years, it would be a further five years or more before sufficient electricity could be obtained from nuclear sources to make up for the potential coal shortage.

When the gas industry reported a small surplus a year ago questions were asked as to whether it might be returned to the consumer by way of reduced gas prices, but Sir Harold Smith wisely drew attention to the necessity for making more adequate provision for replacing

old equipment with new at higher prices. A similar situation exists in the electricity industry, and *The Times*, in commenting on the sixth annual report, suggests that nationalised electricity continues to lean far too heavily on the public's savings, 'and that is certainly in part because consumers are paying less than the economic price. The right pricing policy is not, indeed, self-evident'. The Ridley Report advocated generally that consumers should be charged what electricity really costs. And on this question of price, the *Electrical Review* comments that although the price of the unit went up by nearly 5%, and despite complaints of excessive charges, electricity remained cheap at the price; nevertheless, it added, the B.E.A. and area boards must continue to maintain the closest watch on costs and do all they can to improve the load factor to keep the price from rising further.

BRITISH STANDARDS

For the first time since the war ended the British Standards Institution has issued a printed report on its activities in the many fields of industry and trade with which it is now concerned, a report which reflects the very wide and rapidly growing scope of the Institution's activities on behalf of industry. The year under review saw the opening of a new chapter in the history of the Institution with the move to new premises at British Standards House, 2, Park Street, W.1. It also saw over the broad range of the Institution's work a further increase in activity and in output, together with greater efforts to pubilicise what is being done. Notable in the mass of statistics printed in the report are the facts that 914,000 copies of standards were sold during one year, compared with 782,000 in the previous year; that subscribing members increased from 7,800 to 8,000; that standing committees now number 2,388 and committee membership is 14,000; and that 3,420 committee meetings were held during the year. Although it runs to a total of 200 pages, the report provides almost at a glance an impression of the comprehensive range of industries which use the Institution facilities to prepare agreed standards for their products and services.

One of the most satisfactory features of the year was the completion of much work on what have come to be known as the basic engineering standards—basic in the sense that many other standard projects depend on them and must remain incomplete in dimensional detail until they are published. The work has taken a long time, but standards of such far-reaching importance call for thorough examination and cannot be introduced without the most careful referendum among all the many interests affected. Moreover, all these standards were discussed to a greater or less extent among the 'ABC' (America, Britain, Canada) countries and at technical committees of the International Organisation for Standardisation with a view to ensuring co-ordination wherever possible with similar developments in other countries. The extent of this co-ordination actually achieved is considered to be very satisfactory.

Quite extensive research is involved in the preparation of many British Standards, and as the Institution itself has no facilities to carry out such research it has to rely on outside bodies for this help. The considered policy is indeed that it is better to rely on the research resources available in the various industries, and that the B.S.I. should not contemplate the setting up of centralised facilities which could not, in terms of technological knowledge, compare with the planned facilities available in industry as a whole. Facilities are freely given by the D.S.I.R., the research associations, and many industrial firms. To name only a few of the research projects in hand, investigation is proceeding into methods of analysing coal and coke; on air conditioning filters, and on the use of blue glass for protection against infra-red rays.

Reports on the standards projects undertaken and completed during the year under review by some 60 major industries occupy the largest single section of the book. They include a record of several thousands of items of 'work in hand'—standards projects which are in various stages of development, from the initial idea to the preparation of new or revised drafts. This section above all gives a clear impression of the range and volume of B.S.I. activities and of the liveliness with which the work is kept constantly on the move. A separate special section records the total of well over 100 subjects in which international alignment of standards is being prepared through the International Organisation for Standardisation (I.S.O.) and the International Electrotechnical Commission (I.E.C.). Some 70 pages are devoted to lists of the members of the principal Councils and Industry Standards Committees working within the B.S.I.

The financial position of the Institution is reported to be satisfactory. Income has increased sufficiently to cover the expenditure involved in the removal to the new headquarters; income figures under all the main heads have reached record levels. Subscriptions reached £110,167 compared with £106,766 in the previous year. The decision on the Government grant dating from the recommendations of the Cunliffe Committee extended to the end of the year 1953-54, and the level of the grant for the succeeding three years has been under consideration. Subject to annual Parliamentary approval, the intention is that for 1954-55 the grant will equal the amount of the industry subscriptions in the preceding year up to a maximum of £110,000, and similarly for 1955-56 and 1956-57 up to maxima of £120,000 and £130,000 respectively. A substantial increase in industry subscriptions will be required if full advantage is to be taken of the available Government grants.

From its inception as the British Engineering Standards Association, the B.S.I. has had the warm support of the gas industry, whose representatives, directly or indirectly, serve not only on the Engineering Divisional Council and the committee dealing specifically with gas appliances and fittings, but on other committees ranging from chemical engineering to instruments, and from mechanical engineering to tar and solid fuels.

SALARIES OF GAS STAFFS

At a meeting of the National Joint Council for Gas Staffs last week, consideration was given to a claim from the staffs side for increases on all salaries and salary scales. Agreement was reached that graduated increases on existing nationally agreed salary scales for men, ranging from £10 per annum to £25 per annum, should operate in respect of work performed as from October 1. It was also agreed that 80% of these increases should apply to the existing salary scales for women as from the same date.

Personal Notes

MR. TREVOR G. WILLIAMS, whose appointment as Editor of the 'GAS JOURNAL' was announced on July 7, is now installed in No. 11, Bolt Court.

MR. J. TUDOR REES, of the West Midlands Gas Board, has retired after 47 years' service. He joined the Birmingham Gas Department in 1907 and worked in various departments of the undertaking. Returning after demobilisation, Mr. Rees became a salesman in the central showroom and, after a time, district inspector. In 1932 he was appointed Superintendent of Harborne branch office; in 1939 Fittings Superintendent; and then in 1948 he was appointed Manager, Sales and Service Department. Shortly after vesting day he was appointed Sales and Service Manager to the Board, and he held this position until December, 1952, when he became adviser to the Board on sales and service policy.

MR. LEONARD M. BROADWAY has taken over the position of Managing Director of C. C. Wakefield and Co., Ltd. from Mr. Alonzo Limb, who has had to relinquish this office owing to ill-health. Mr. Limb will continue as a Director. Mr. Broadway joined the Company 34 years ago. He was appointed Secretary by the late Lord Wakefield in 1938. following a wide experience in administrative and financial matters, including the formation of the Wakefield Group of subsidiary companies, Mr. Broadway was elected to the Board in 1947, becoming Joint Assistant Managing Director in 1952. The Assistant Managing Director will be MR. WILLIAM F. LIST.

MR. L. L. BOTT (General Works Manager), MR. A. G. HOWE (Chief Engineer), and MR. T. L. KENDALL (Sales Director of Ruston & Hornsby, Ltd.) have been appointed Directors of Davey, Paxman & Co., Ltd., of Colchester. Mr. Bott joined Ruston & Hornsby, Ltd., in 1944 as Production Engineer, being promoted to Deputy Works Manager in 1946. In 1947 he was appointed Works Manager, Engine Division, at Davey Paxman & Co., Ltd., taking charge of diesel engine manufacture at the Standard and Britannia Works. In 1951 he was appointed General Works Manager. Mr. Howe started at Davey, Paxman & Co., Ltd. (where he served his apprenticeship) in 1916, and was later given charge of the gas department in the drawing office. From 1925 to 1930, he worked with Lentz Patents, Ltd. (afterwards Loco. Equipment Co., Ltd.) on the design of locomotive valve gear, etc. He returned to Davey Paxman for a short period and then joined the design staff of Robey of Lincoln, following which from 1931 to 1936 he worked with the Sentinel Waggon Works at Shrewsbury on locomotive engine and boiler design and development. Returning again to Davey, Paxman & Co., Ltd., he was given charge of the design and development of the Vee type engine department and was appointed Chief Diesel Engineer in 1940, responsible for design, development and research.

MR. R. GILLESPIE has been appointed to the Board of Meters, Ltd.

MR. PAUL REILLY, who has been Chief Information Officer of the Council of Industrial Design since April, 1948, has been appointed Deputy Director in charge of the Industrial Division. His responsibilities will include the Council's relations with industry, its exhibition programmes, the promotion of *Design Review* (the Council's illustrated record of well-designed goods in current production) and of the *Record of Designers*, through which manufacturers in search of qualified designers are put in touch with suitable candidates.

Obituary

MR. D. R. A. PISTOR, a Director of B.K.B. Electric Motors Ltd., and for nearly 40 years Manager of the Hibbert Street Works of George Kent, Ltd., died suddenly on September 23 while on holiday in Scotland.

Correspondence

GAS PUBLICITY

DEAR SIR,—Mr. R. J. Gregg is to be congratulated on the paper he presented to the Scottish Association of Gas Managers. There can be no doubt that more salesmanship is necessary. Like many other manufacturers we manufacture products for operation by gas, bottled gas, paraffin and electricity, and there cannot be the slightest doubt that the appliances most difficult to sell are those operated by gas.

This is not due to any shortcoming as far as the appliance is concerned, but almost entirely to the fact that gas boards restrict their purchases to a very few manufacturers and are loath to try anything new. As gas boards have a virtual monopoly as far as the sale of gas appliances is concerned it follows that many manufacturers prefer to concentrate on appliances using fuels other than gas, purely and simply because the distributors of these other appliances are much more co-operative and, of course, much more numerous.

The purchase of electrical appliances, for example, by electricity boards, is left to the showroom manager, in other words the man who is responsible for selling them. As far as I can see, showroom managers in the gas industry have little say regarding the purchase of the appliances which they have to sell.

I have discussed this problem with other manufacturers and am convinced that if the gas industry would only experiment a little more, especially in the handling of products produced by new manufacturers, and furthermore go to the trouble of encouraging new manufacturers to enter the gas appliance field, the cumulative effect of the advertising of these new firms would be advantageous to the gas industry.

The smaller manufacturer may not be able in his early stages to supply the gas industry and give the same sort of service as the big manufacturer, but if encouraged, he would go out of his way to do everything possible to develop his gas appliance sales.

As a believer in private enterprise I am all for competition between the various fuel producing industries because it makes for efficiency. If a person wants to buy an electrical appliance, she can go into an electrical contractors or the electricity board showrooms and see literally hundreds of different sorts of appliances. If she goes into a gas board showroom she sees a range of perhaps 10 or at the outside 20 appliances suitable for a particular purpose. It is the variety of electrical appliances which makes electricity board showrooms so attractive and so interesting to the public. Yours faithfully,

A. C. HAZEL,
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September 30, 1954.

Calendar & Directory

ALTERATIONS

THE following changes have been notified during the past month. To keep the information in the current 1954 edition of the GAS JOURNAL CALENDAR AND DIRECTORY up to date readers are invited to note these alterations (together with the appropriate adjustments relating thereto in the 'Personnel' section of the DIRECTORY, pp. 138-150).

Page 22.—SCOTTISH GAS CONSULTATIVE COUNCIL: Sir Robert Nimmo, *Ch.*, vice A. T. Morrison, deceased.

Page 88.—TONBRIDGE. Delete B. P. Bezant, *E.*, retd.

Page 103.—ISLE OF WIGHT. G. G. Warne, *E. and G.M.*, vice J. P. Hall, deceased.

Page 125.—SCOTTISH GAS BOARD. Sir Robert Nimmo, Ex-officio *Member, Ch.*, G.C.C., vice A. T. Morrison, deceased.

Page 131.—FORRES. T. Stewart, *M.*, vice J. Storrier.

Page 136.—TROON. W. Marshall, *M.*, vice J. W. Beveridge.

Page 181.—WALES AND MONMOUTHSHIRE SECTION, I.G.E. J. H. Chapman, *Ch.*, J. F. Lloyd, *Senior Vice-Ch.*, A. H. Dyer, *Junior Vice-Ch.*

Further Photographs of Dumbarton

We are now able to publish some further photographs of the Scottish Gas Board's new gasworks installation at Dumbarton, which was described in the 'JOURNAL' of September 22.

The striking illustration above shows the three new condenser units supplied by Newton Chambers & Co., Ltd. The three existing water tube condensers were too small to carry any further load and as they were on the site of the proposed extensions, it was decided that they should be replaced by a 3 mill. cu.ft. new vertical tube condenser.

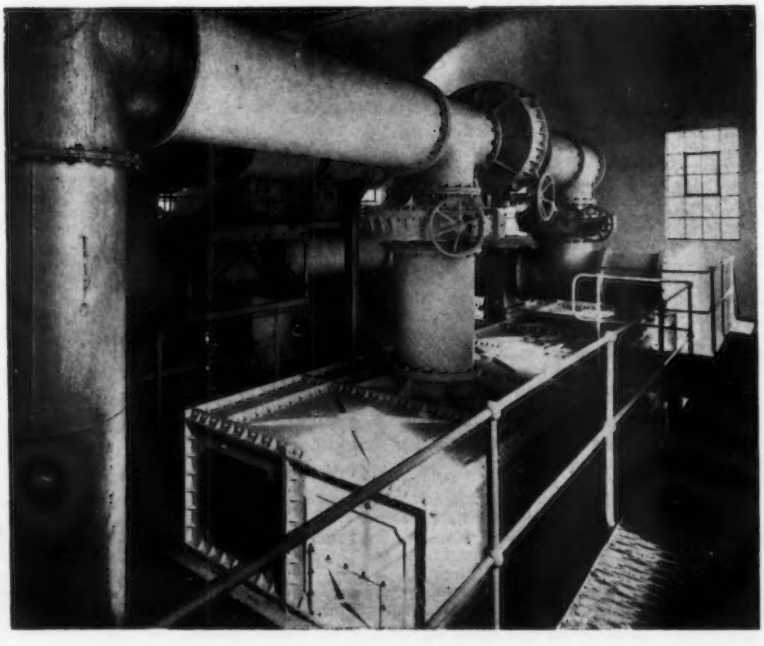
For cooling the gas from the new retort house, two mild steel vertical water tube condensers were provided, arranged to be worked in parallel and with the gas connections so arranged that the gas from either or both retort houses can be distributed between all three condensers. Each condenser is of welded construction with a cooling surface of 9,000 sq. ft., having 720 vertical water tubes, 2½ in. outside dia. and four gas passes.

The condensers are fitted with gas and water thermometers and the temperature of the gas leaving each condenser is maintained at 65-70°F. by the action of an air-operated water control valve regulated by a thermostat in the gas outlet main. A valve operating platform is provided at the top of the condensers with a two-flight staircase to give access to same from ground level.

On the left is the wet purification house, showing the Livesey washer and static ammonia washer, also by Newton Chambers. This is of 6 mill. cu.ft. per day capacity and is constructed of cast iron plates. The washer is arranged in two units, each unit containing four washing compartments with mild steel division plates. The washing compartments are partially filled with stoneware Lessing rings, 2 in. dia. by 2 in. long. The scrubbing liquor is distributed over the filling medium by perforated drip trays.

The gas flow is alternatively upwards and downwards through the washing compartments in counter-current direction to the washing liquor. The liquor is circulated by two sets of multiple pumps. The ammonia content of the gas, after washing, is about 3 grains per 100 cu.ft. The gas connections are 30 in. dia. of cast iron and are so arranged that the two units of the washer can be worked either in series or independently.

Newton Chambers & Co., Ltd., were also responsible for the two sets of 3 mill. cu.ft. per day oxide purifiers which are fully equipped for scientific control, including the 'Newton' (not 'Norton' as published in our issue of September 22) cast iron needle tube gas heater at the inlet of each box, and for the 5 mill. cu.ft. capacity spiral-guided holder illustrated in our earlier report.



Industrial Gas Developments

FROM A PAPER TO THE NATIONAL SMOKE ABATEMENT SOCIETY, ANNUAL CONFERENCE, ON SEPTEMBER 23, 1954, BY

R. F. HAYMAN,

B.Sc., F.R.I.C., M.Inst.Gas E., M.I.Chem.E., M.Inst.F., Industrial Gas Officer, Gas Council

Gas sold for industrial processes is now about 25% of the total load of the gas industry and the industrial load has grown from 390 mill. therms in 1945 to 650 mill. therms in 1953. This growth has been accompanied by the parallel growth in industry of the desire for greater use of such facilities as line production and automatic ignition and operation of equipment, together with satisfactory performance with the minimum of labour and maintenance for long and arduous periods. In a great number of processes these requirements are coupled with a strict need for close control of temperature, pressure, and other physical factors. This has demanded a change of technique in design and operation of plants.

The industrial gas load in itself shows wide variations. Naturally in the country or holiday areas there is substantially less concentration of industrial plant than in towns like Sheffield or Birmingham, and it can be said that where industry is thickest, there is the greatest opportunity for smoke abatement. This may take a variety of forms, since London, for instance, is the home of small industries and there are very many thousands of factories, each requiring an individual approach to its particular problem. On the other hand, in some of the big industrial centres the problem of smoke abatement may be largely resolved if it is possible to reorganise the activities of a few firms.

The size of plants concerned vary as widely as the loads or processes going on in them, and gas-fired units are available in gas rates ranging from 50,000 cu.ft. per hour (250 therms) and more, down to a few cubic feet per hour. The small units must not be neglected, because collectively they can add up to a great deal. For example, Birmingham and district, a great industrial area where the industrial gas load is 42% of the total load, sold about 47 mill. therms in 1952-53 for this purpose, whereas the North Thames Gas Board, in an area not always considered an industrial one, sold about 75 mill. therms in the same period to industry.

Coal used in industrial processes is of the order of 35 mill. tons a year. Industrial gas is now consumed at the approximate rate of 650 mill. therms a year, which is considered to do the same work in the factories as 4.7 mill. tons of coal. It could be argued that about 10% of a possible smoke problem is already being tackled by the gas industry. This is not inconsiderable, and the activities of the gas industry in this direction are worth some attention.

Ceramics and Pottery

It is perhaps in the fields of ceramics and the production of pottery that industrial gas and smoke abatement can be considered to go hand in hand in the most striking way.

Fig. 1.

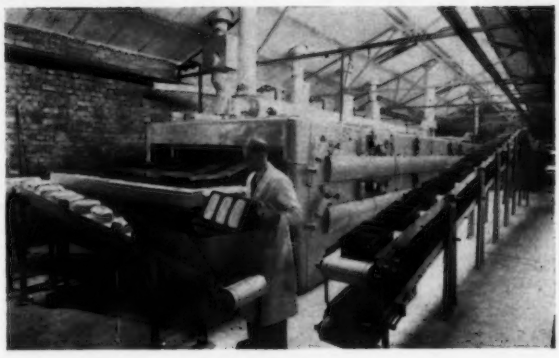


Fig. 2.

Town gas in this industry is being used extensively, not only for firing clay ware, but, for example, drying, bone calcination, and frit melting. The progress of gas-fired equipment in the Potteries has been phenomenal and the field is now being extended to the firing of floor and roofing tiles and other heavy clay products.

The growth can be illustrated by the fact that before the war it has been estimated that 1 mill. tons of coal were used in the pottery industry only in Stoke-on-Trent. The change-over from coal to gas firing has helped to reduce this figure to 400,000 tons. In 1952, for instance, some 23 mill. therms of gas were used for pottery firing, to produce which the gasworks required approximately 280,000 tons of coal. It is estimated that this quantity of gas replaced 336,000 tons of coal previously used in the raw state.

There are three main problems in the production of ceramics:

1. The firing of clay ware in the basic state at about 1,100° to 1,200°C.
2. The firing of glost ware at about 1,000° to 1,100°C.
3. The firing of decorated ware.

In all these cases, there is a wide range of gas-heated plant, and for large scale production the continuous kiln is rapidly assuming the most important role.

The many advantages of continuous tunnel kilns have been summarised as follows: Economies in fuel consumption, production of better ware, improved control of firing processes, reduced labour costs, better working conditions, reduced expenditure on saggers, continuous output of gas. In the continuous kiln, control of temperature across a section, and indeed of the whole firing cycle, is easy. Handling is reduced to the minimum and the loss of heat, and wear and tear on the oven structure, common in intermittent heating and cooling, are substantially reduced.

Fig. 1 shows one of the latest examples of a continuous kiln firing once-fired sanitary fireclay ware. This kiln is 416 ft. long and has an approximate gas consumption of 47 therms per hour. It is a muffle kiln in which the system of combustion is a gas-air 1 to 1 premix by volume. This mixture is discharged at 3 lb. per sq. in. through injectors which induce the remaining air required for combustion directly from the tunnel. Combustion takes place in a closed chamber set on either side of the tunnel. This arrangement gives preheated secondary air at a high temperature, about 900-1,000°C., ensuring economy in gas consumption.

The development of a good kiln is dependent, among other things, on suitable refractories, and continuous improvements are being made. Economies can still be made by paying close attention to burner and combustion chamber design and the use of pre-heated air for combustion. A growing use is also being made of light

weight insulating refractories, which have a low heat capacity and, therefore, enable a kiln to heat up quickly, but which are tough enough to enable quite strong structures to be built. Their low thermal conductivity and small pore size minimise heat losses. These advances are similar to those continuously being carried out in all branches of furnace design.

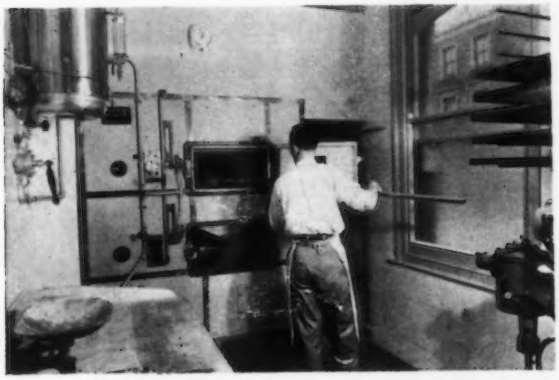


Fig. 3.

Growing attention is being paid to the use of light-weight kiln furniture and where possible the use of open or direct fired kilns in place of muffle kilns. Such a design eliminates the need for expensive muffles and materially raises the thermal efficiency of the structure.

The smaller section of the industry which concerns itself with educational, studio, or art pottery is an important one, which is spread more or less evenly over the country. The problems in this field are often economic in that kilns are required for the minimum price. On the other hand, even a small kiln is a piece of equipment carefully designed for its job and it should not be turned out by the amateur. To meet the need for the student or craftsman a variety of equipment operating at temperatures up to 1,450°C. can be produced. The lower temperature range up to 1,200°C. is of particular value to schools and educational establishments where increasing interest in the subject is being taken.

Bread and Biscuit Baking

This industry is of vital importance to the well-being of the nation; and with modern equipment close control of baking conditions is essential.

Fig 2 shows an automatic unit producing about 1,200

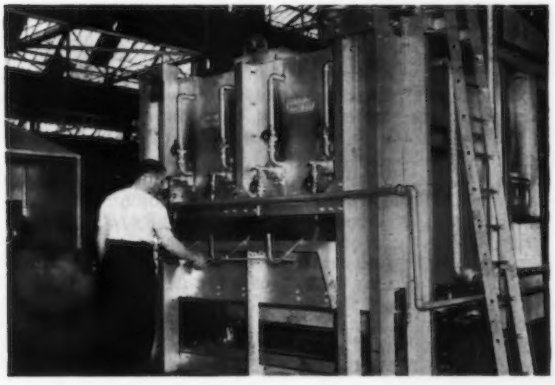


Fig. 4.

loaves an hour. In this particular oven some of the products of combustion are used to heat the final prover. The picture shows the economy in manpower possible in modern plants giving high rates of production.

There are very large numbers of small bakeries where output does not justify the installation of a continuous oven, but where batch operation of a wide variety of bread and delicacies to serve the local community demands a unit capable of quick response and the maximum use with the minimum of heating up time and maintenance.

Fig. 3 is a photograph of a small family bakery producing bread and small goods for selling to the public over the counter. In this small, but attractive bakehouse, there is little space for anything but the tools for the job. The ease of control of the equipment ensures a high rate of good quality production.

The gas baking load has grown enormously, as shown by the figures for recent years in the area of the North Thames Gas Board:

Year	Therms
1945	65,000
1947	1,300,000
1948	2,000,000
1950	4,000,000
1953	7,000,000

In spite of the many advantages of gas for baking, it may be that economics will control the growth of the load for the time being, but progress in design must still go on, and the high standards which improved conditions of food manufacture demand can readily be met by gas heated equipment.

A similar story can be told of biscuit manufacture, an industry in itself, where production is virtually continuous.

The mechanics of baking has not been studied as fully as it might have been and there is no doubt that the rate of heat transfer to food in cooking can be improved with subsequent economies in operation.

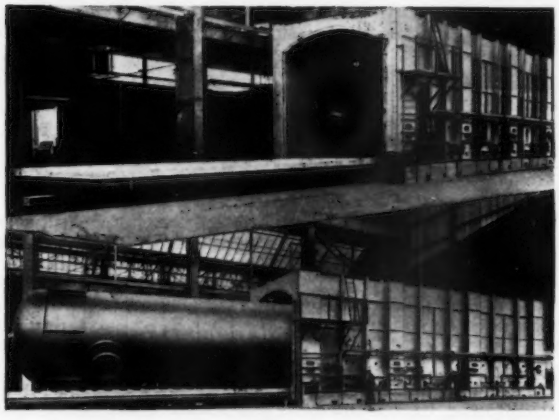


Fig. 5.

A great number of heating problems demand special technique for metal handling, which, if not particularly profound, call for modifications to standard practice. This, of course, is where the great flexibility of gas operated equipment can help, and Fig. 4 shows a typical example of a gas-fired walking beam furnace for heat treating the stabiliser springs for motor car suspensions. This particular furnace, which is operating on coke oven gas, and which could be fired quite as well with town gas if the situation required it, heats a variable output of 30—100 bars per hour up to 960°C.

The bars are placed in a vertical magazine at the charging end of the furnace and fed on to an elevator conveyor before being placed in 'V' grooves on alloy steel walking beams which progress the bars slowly through the furnace. At the end of the traverse the bars roll off the end of the alloy steel beam down a discharge chute which is provided with alloy steel flap plates for minimising infiltration of cold air into the working chamber. After dropping on to the discharge hoops, the operator places the bar in a hydraulic bending and quenching machine seen on the left of the photograph. After quenching, the bars are tempered in a batch recirculated atmosphere gas-fired furnace.

This furnace is automatically controlled and fitted with temperature indicating and recording equipment. An important point in this case was the limitation of floor space, virtually no room at all being available for anything other than the working zones and the operator.

In recent years the development of the oil industry in

his country has led to furnaces being installed by welding nd fabricating companies of sufficiently large size for he necessary stress relieving and annealing of the welded ressure vessels. One of the largest furnaces in the British sles for this purpose, shown in Fig. 5, is installed at Motherwell. It is of the bogie or carbottom type, with a idth of 14 ft., a height of 15 ft. and a length of 56 ft. his furnace is capable of dealing with vessels up to 100 ons in weight. It has burners having a capacity of 115 herms of gas per hour, and four zones of temperature ontrol. It is built of light weight insulating refractory vith the exception of the bogie, which must withstand the eavy charge.

Fallon ('GAS JOURNAL,' June 23, 1954, p. 853) has referred to further recent outstanding installations, among which is quoted a plant heated by coke oven gas consisting of transportable lift-off furnaces each weighing 60 ons and each handling a load of four stacks of 6 ft. iameter steel coils 15 ft. high. The total weight per harge is 350 tons. Annealing is carried out in a gas of high nitrogen content generated from the heating gas. The entire plant is 1,300 ft. long and produces 10,000 ons of bright steel strip per week for a consumption of approximately 20 mill. cu.ft. (100,000 therms) a week. It is the largest plant of its type in Europe.

Glass

Melting, forming, and subsequent heat treatment of glass is a large industry with numberless ramifications. Large scale melting by gas, like many other heavy operations, is possible only if an abundant supply of cheap fuel is available. Production of glass shapes such as bottles and similar containers on an enormous scale by automatic machinery demands very close control of temperature of the glass being fed to the plant, particularly as the shape, size, and weight of the finished article usually is rigorously controlled by the consumer's specification. The importance of temperature control is indicated by the fact that normally, to minimise rejects and to ensure satisfactory production, variation in the temperature of the glass tank feeder must be of the order of plus or minus 2°C. Many plants are now being equipped with gas heated feeders which ensure the close control required.

Glass tank feeders are long, shallow, closed refractory structures placed just below the glass line of the melting furnace and are built outwards to a length varying from 5 ft. to 20 ft., or even more. The length is dependent on two factors, one being the space available for positioning of the automatic machines and the other, the length of the feeder which is considered necessary to gain control over the temperature of the glass after it leaves the tank furnace.

The smaller the object being made, the slower is the rate of flow of the molten glass along the feeder length, with a consequent greater gas consumption required to maintain the feeder temperature, as the heat losses from the structure remain constant. Conversely, the larger the object under manufacture, the more is the heat supplied to the feeder by the glass flowing from the furnace.

Heating of these feeders is commonly carried out by town gas to ensure the closeness of temperature control which is essential. Fig. 6 shows a typical view of such a feeder. These plants are large gas users and one tank may well consume hundreds of thousands of therms in a year.

A recent development, where a new production technique is linked to a need for a very large output is in the production of television tubes. This process again demands close control of conditions to ensure that the large surface area of the tube shall be free from strain. There are a variety of methods now employed using a combination of heating and annealing by radiation and convection. The design of plants varies according to the size and shape of the tubes, but they are all necessarily complicated by the need to co-ordinate many operations including heating, removal of unwanted glass round the neck, exhausting, and sealing.

Equipment of General Application

Modern equipment requires to be operated under conditions of increasing severity. The jet engine and the rocket are examples where substantial developments in metallurgy and ceramics have made a high performance possible.

Such requirements, in turn, demand the ability to conduct research, development, and production at increasing levels of temperature. Where, for instance, 1,350°C. used to be adequate for most heat treatment processes, this figure has now been raised in special circumstances.

Equipment is available for a great variety of operations at increasingly high temperatures which, until recently, had about 1,800°C. as a general upper limit. Recent advances in furnace design, coupled with the availability of superior refractories, has enabled a temperature of 2,100°C. to be rapidly achieved and held in practice in a chamber of appreciable size at the moment about 15 in. by 14 in. by 14 in.

The ability to achieve a temperature in excess of 2,000°C. will open up several new important fields, in the first place, for research and development into such important subjects as high temperature ceramics and metallurgy. The size of the furnace now available will enable the behaviour of materials to be studied on a scale not previously possible at this temperature.

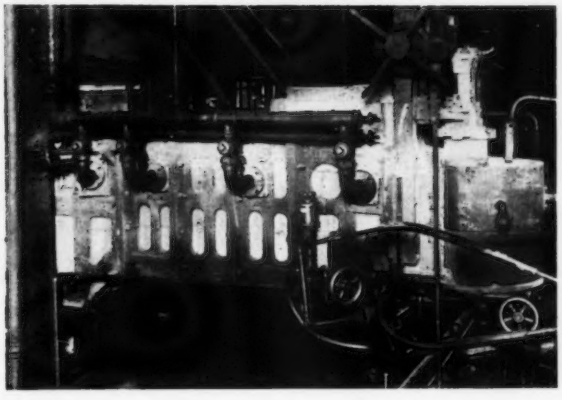


Fig. 6.

The use of direct fired air heating is of long standing, but there is a growing field for this method of heat application. Direct firing has many advantages including quick heating up, rapid approach to equilibrium conditions and quick thermal efficiencies approaching 90%.

A direct fired air heater now available consists of a burner which is stable in an air blast produced by a fan. The excess air generated mixes violently with the hot gases from the burner, which is mounted in a refractory chamber, and the resultant stream of warm air is directed to where it is required. The equipment is automatically controlled and is fitted with a flame failure device.

A predetermined air temperature up to 800°F. can be produced as required. The value of such a unit in foundries is to be able to dry sand moulds continuously and uniformly without any local overheating. Moulds dried by this method are clean and ready immediately for casting. There are several core and mould driers which have replaced ovens fired with solid fuel.

A similar technique is adopted in generating hot air which is fed to a spray drier employed for the production of a synthetic cream which is sold in powder form. Spray drying in this case is particularly suitable since prolonged heating at high temperature would cause deterioration of the product. Further, the product, after spending a controlled minimum time in the drier leaves realy for marketing without further processing.

Direct fired air heaters take the minimum amount of space and in this case the unit can be accommodated close to the drier without the need for a separate building.

The heater, designed to operate at a maximum rate of 15 therms per hour with a maintenance rate of about half this figure, is only 9 ft. long by 3 ft. in diameter. This unit operates under completely automatic control and is fitted with an electronic flame failure device. The ease of operation possible with such plants is always regarded by the operators as a great advantage.

DISTILLATION OF SCOTTISH COALS

By C. A. POULSON.

Continued from p. 797 'GAS JOURNAL,' September 29.

Economics of gas production is a subject of many variables such as seasonal demands, changing costs of labour, coal and coke, but a general basis can be established to effect a relative assessment, and the method I have set out conveys a reasonable comparison.

In the accompanying tables I have shown the relative net cost of making 3 mill. cu.ft. per day or 1,095 mill. cu.ft. per annum from Lanarkshire gas nuts at a calorific value of 500 B.Th.U. per cu.ft. compared with the production of an equal number of therms per annum at 475, 450, 425, and 400 B.Th.U. respectively.

COMPARATIVE COST OF GAS PRODUCTION IN VERTICAL RETORTS AT VARYING CALORIFIC VALUES

TABLE 1

COALS .. .. Lanarkshire gas nuts.
BASIS .. .. 3 mill. cu. ft. per day at 500 B.Th.U.
1,095 mill. cu. ft. per annum.
DATA .. .. Cost of coal .. .. 84s. per ton
Selling prices: Coke .. 89s. ,, ,,
Breeze .. 30s. ,, ,,
Tar .. 100s. ,, ,,
Maintenance .. .. 2s. ,, ,,

ESTIMATED RESULTS

Calorific value B.Th.U. per cu. ft.	Yield per ton, cu. ft.	Coke for sale, cwt. Coke	Breeze	Tar, gal. per ton
500	12,400	10.2	0.5	14
475	14,125	9.8	0.5	15½
450	16,500	9.0	0.6	17
425	19,750	8.2	0.7	18½
400	23,400	7.3	0.8	20

Labour	Per shift	Per day	Per day
Top men and boiler	2	33s. 4d.	£10 0 0
Bottom men	1	33s. 4d.	£5 0 0
Foremen	1	34s. 2d.	£5 2 6
Coke hoppers	1	@ 33s. 4d.	£1 13 4
Greaser and handyman	1	@ 33s. 4d.	£1 13 4
			£23 9 2

Per year £23 9s. 2d. × 365 = £8,562 5s. 10d.

TABLE 2

COST OF GAS PRODUCTION .. Calorific value 500 B.Th.U.
Annual Make .. 1,095 mill. cu. ft.

DEBIT:

	£ s. d.
Coal = 1,095,000,000 / 12,400 = 88,306 tons 8@4s. ..	370,885 4 0
Labour—*see* Table 1	8,562 5 10
Maintenance = 88,306 tons @ 2s.	8,830 12 0
	£388,278 1 10

CREDIT:

	£ s. d.
Coke = 88,306 × 10.2 / 20 = 45,036 tons @ 89s.	200,410 4 0
Breeze = 88,306 × 0.5 / 20 = 2,207 tons @ 30s. ..	3,310 10
Tar = 88,306 × 14 × 11 / 2,240 = 6,071 tons @ 100s.	30 355 0 0
	£234,075 14 0

	£ s. d.
Gross cost	388,278 1 10
Less residuals	234,075 14 0
Net cost	£154,202 7 10

TABLE 3

COST OF GAS PRODUCTION .. Calorific value 475 B.Th.U.
Annual Make .. 1,095 mill. at 500 B.Th.U.
1,152,631,600 at 475 B.Th.U.

DEBIT:

	£ s. d.
Coal = 1,152,631,600 / 14,125 = 81,600 tons @ 84s. ..	342,720 0 0
Labour—*see* Table 1	8,562 5 10
Maintenance = 81,600 tons @ 2s.	8,160 0 0
	£359,442 5 10

CREDIT:

	£ s. d.
Coke = 81,600 × 9.8 / 20 = 39,984 tons @ 89s.	177,928 16 0
Breeze = 81,600 × 0.5 / 20 = 2,040 tons @ 30s. ..	3 060 0 0
Tar = 81,600 × 15½ × 11 / 2,240 = 6,210 tons @ 100s.	£31,050 0 0
	£212,038 16 0

	£ s. d.
Gross cost	359,442 5 10
Less residuals	212,038 16 0
Net cost	£147,403 9 10

TABLE 4

COST OF GAS PRODUCTION .. Calorific value 450 B.Th.U.
Annual Make .. 1,095 mill. @ 500 B.Th.U.
1,216,666,670 @ 450 B.Th.U.

DEBIT:

	£ s. d.
Coal = 1,216,666,670 / 16,500 = 73,740 tons @ 84s.	309,708 0 0
Labour—*see* Table 1	8,562 5 10
Maintenance = 73,740 @ 2s.	7,374 0 0
	£325,644 5 10

CREDIT:

	£ s. d.
Coke = 73,740 × 9.0 / 20 = 33,183 tons @ 89s.	147,664 7 0
Breeze = 73,740 × 0.6 / 20 = 2,212 tons @ 30s. ..	3,318 0 0
Tar = 73,740 × 17 × 11 / 2,240 = 6,156 tons @ 100s.	30,780 0 0
	£181,762 7 0

	£ s. d.
Gross cost	325,644 5 10
Less residuals	181,762 7 0
Net cost	£143,881 18 10

TABLE 5

COST OF GAS PRODUCTION .. Calorific value 425 B.Th.U.
Annual Make .. 1,095 mill. @ 500 B.Th.U.
1,288,235,290 @ 425 B.Th.U.

DEBIT:

	£ s. d.
Coal = 1,288,235,290 / 19,750 = 65,230 tons @ 84s.	273,966 0 0
Labour—*see* Table 1	8,562 5 10
Maintenance = 65,230 tons @ 2s.	6,523 0 0
	£289,051 5 10

CREDIT:

	£ s. d.
Coke = 65,230 × 8.2 / 20 = 26,744 tons @ 89s.	119,010 16 0
Breeze = 65,230 × 0.7 / 20 = 2,283 tons @ 30s.	3,424 10 0
Tar = 65,230 × 18½ × 11 / 2,240 = 5,926 tons @ 100s.	29,630 0 0
	£152,065 6 0

	£ s. d.
Gross cost	289,051 5 10
Less residuals	152,065 6 0
Net cost	£136,985 19 10

TABLE 6

COST OF GAS PRODUCTION .. Calorific value 400 B.Th.U.
Annual Make .. 1,095 mill. @ 500 B.Th.U.
1,368,750,000 @ 400 B.Th.U.

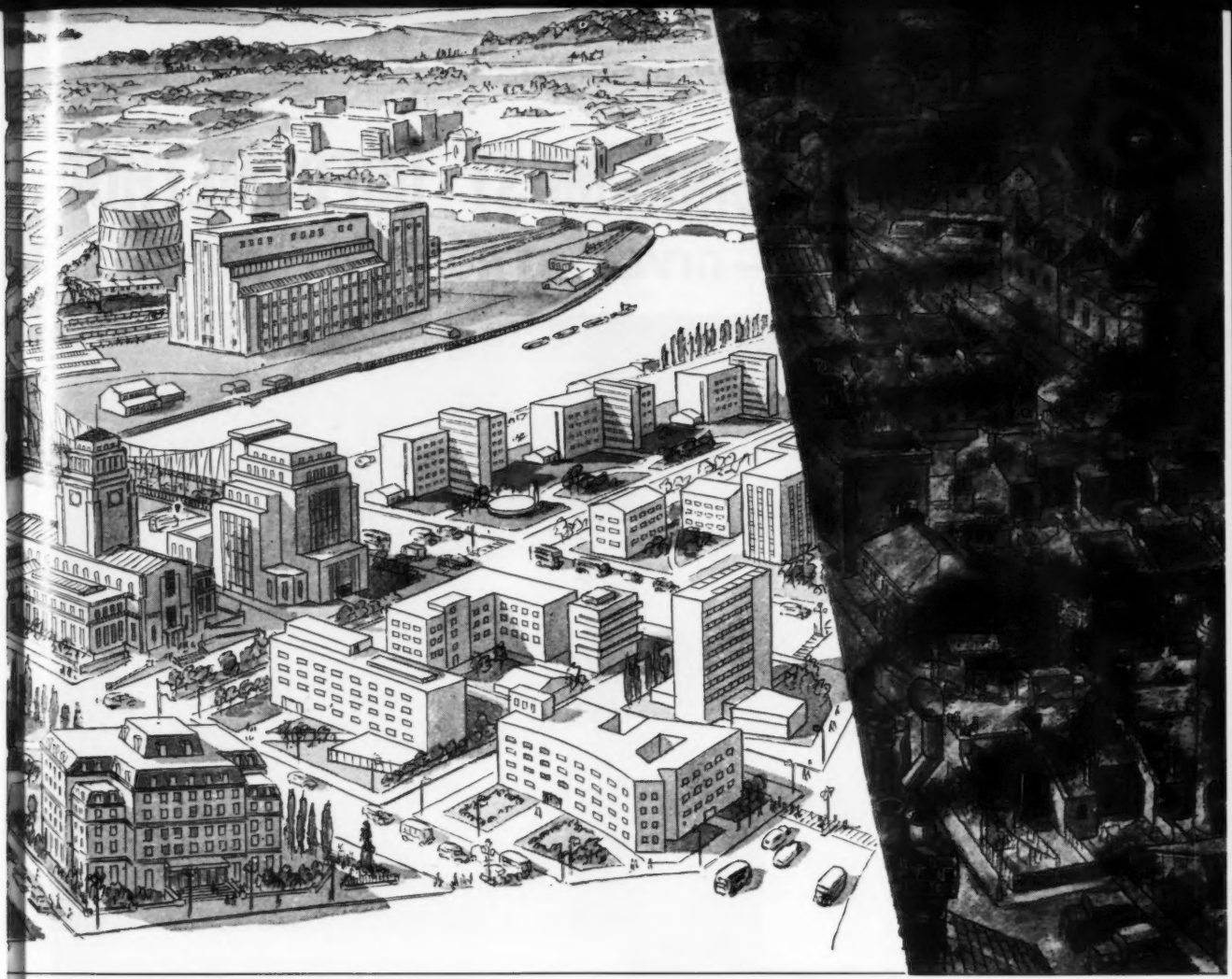
DEBIT:

	£ s. d.
Coal = 1 368,750,000 / 23,400 = 58,494 tons @ 84s.	245,674 16 0
Labour—*see* Table 1	8,562 5 10
Maintenance = 58,494 tons @ 2s.	5,849 8 0
	£260,086 9 10

CREDIT:

	£ s. d.
Coke = 58,494 × 7.3 / 20 = 21,350 tons @ 89s.	95,007 10 0
Breeze = 58 494 × 0.8 / 20 = 2,340 tons @ 30s. ..	3,510 0 0
Tar = 58,494 × 20 × 11 / 2,240 = 5,745 tons @ 100s.	28,725 0 0
	£127,242 10 0

	£ s. d.
Gross cost	260,086 9 10
Less residuals	127,242 10 0
Net cost	£132,843 19 10



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DIAMOND SPLICING MOST USED METHOD

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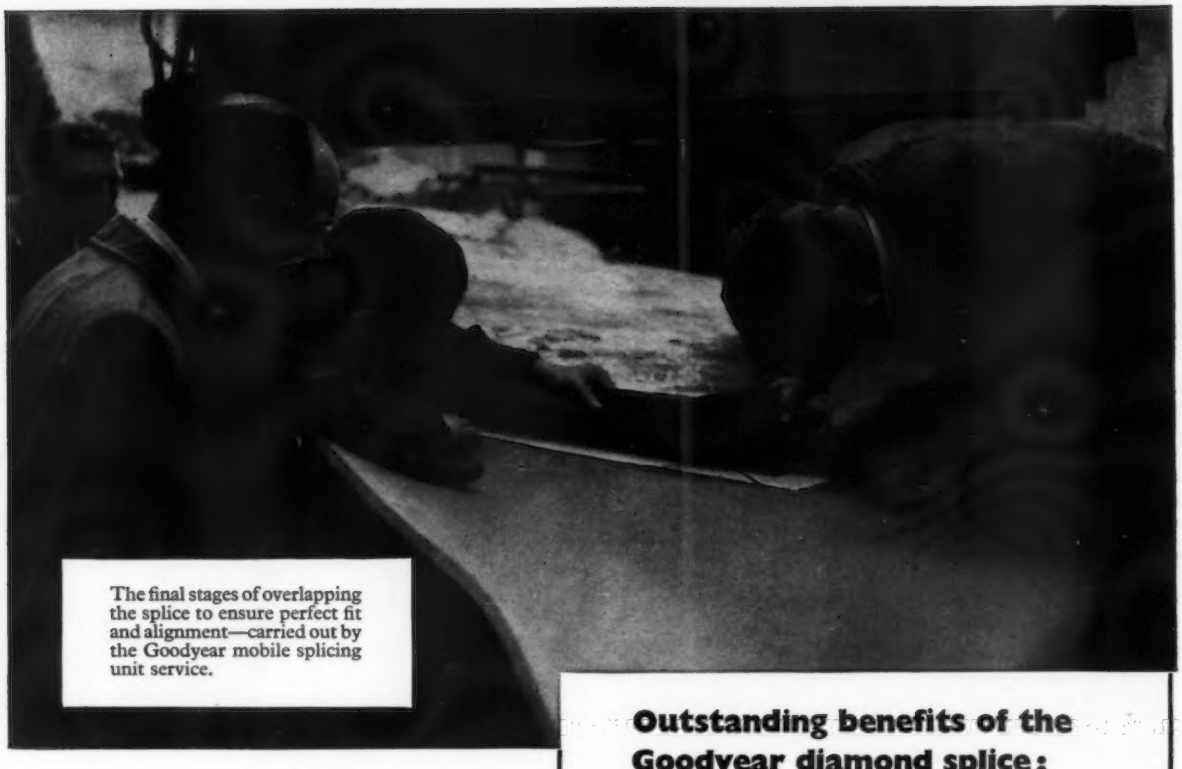

The final stages of overlapping the splice to ensure perfect fit and alignment—carried out by the Goodyear mobile splicing unit service.

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The diamond splice, developed by Goodyear, is recognised as the most satisfactory method of joining conveyor belting yet devised. It has established an undeniable superiority over other methods of splicing.

Installing a Goodyear conveyor belt, made virtually endless by the Goodyear Diamond Splice, is the surest way of lowering the cost per ton. To back up their recommendation of splicing, Goodyear operate a mobile splicing unit. This service is staffed by a team of craftsmen, equipped to carry out on-the-spot splicing anywhere. Furthermore, specialists—each familiar with the problems of a particular branch of industry—are available at Wolverhampton to assist or advise you in the choice, installation, maintenance or repair of Goodyear Industrial Rubber Products. For further information write direct to Dept. B.5, The Goodyear Tyre & Rubber Co. (G.B.) Ltd., Wolverhampton.

Outstanding benefits of the Goodyear diamond splice:

1. *Complete freedom from tearing or pulling out.*
2. *No gaps through which to spill fines.*
3. *There is no tendency for the ends to drift while vulcanizing the joint; the belt is in perfect alignment.*
4. *At any cross section through the splice, only a small part of a single ply is lost to tension, resulting in high joint efficiency.*
5. *Greater strength at the joint frequently makes it possible to reduce the number of plies, increasing the flexibility of the belt and reducing its cost.*
6. *The Goodyear method ensures even distribution of tension at the belt ends, which is much more important than the strength of the splice in straight tension.*
7. *The diamond splice gives a smooth joint, with no impact on pulleys, idlers and scraping devices.*
8. *Fastener bending stresses are avoided, and the belt wraps the pulleys as closely at the splice as at any other point.*
9. *Heat deterioration of the belt, due to fasteners, is eliminated.*

GOODYEAR

INDUSTRIAL RUBBER PRODUCTS

CONVEYOR BELTING · V-BELTS · TRANSMISSION BELTING · INDUSTRIAL HOSE

SUMMARY : COST OF GAS PRODUCED PER ANNUM

Calorific value	Net cost
500	£154,200
475	£147,400
450	£143,800
425	£136,990
400	£132,850

The technical assumptions in the tables are that these coals will steam down to 400 B.Th.U. with makes per ton lying on the appropriate West's steaming curve. These curves and this assumption are based on that long line of tests which began with the Fourth Report of the Gas Investigation Committee work at Uddingston in 1920. These and later work also showed that the amount of coke consumed in the steaming process may be taken as not more than 15 lb. of coke for every additional 1,000 cu.ft. of water gas generated in this way. The third assumption is that the thermal output per retort would remain constant.

The financial calculations are based on present-day prices of coal and residuals and show that the best financial return—that is, the cheapest therm—with these Lanarkshire coals is obtained at the lower calorific values. On the results shown in Tables 1 to 6, gas made at 400 B.Th.U. is cheaper than any other. Experience appears to show, however, both in the Uddingston Research results and in those at the Fuel Research Station, that thermal output per retort would fall off very rapidly below this point.

There is, however, one more consideration to be borne in mind. The volume of gas to carry the same number of therms rises as the calorific value falls; and while considering these financial calculations due regard must be paid to the general distribution system of each district. It would appear that the best all-round calorific value, when using Scottish coals, to give maximum service conditions and at the same time nearly the cheapest therm ex retort house, would be 425 B.Th.U. per cu.ft. At this value it should not be difficult to maintain that constant calorific value and pressure upon which consumer satisfaction is based.

Considering the integration schemes in hand, or under consideration, with larger gas-making centres envisaged in the future, the foregoing calculations have been formulated on the assumption of base load operation. The financial returns also remain reasonably comparative if taken on the basis of, say, 300 maximum working days, as against a full year's working of 365 days.

Moreover, if the figures are calculated on lower gas makes per ton, approximating more closely to the average works results obtained with present coals, say, 19,000 cu.ft. per ton at 425 B.Th.U. gas, and 21,000 cu.ft. at 400 B.Th.U. gas, the comparative annual totals are £142,046, and £147,046, respectively, as shown by the calculations in Tables 7 and 8.

TABLE 7

COST OF GAS PRODUCTION .. Calorific value 425 B.Th.U.
Annual Make @ 500 B.Th.U. = 1,095 mill. cu. ft.
@ 425 B.Th.U. = 1,288,235,294 cu. ft.

		£	s.	d.
DEBIT:				
Coal	$= \frac{1,288,235,294}{19,000}$ = 67,802 tons @ 84s.	284,768	8	0
Labour—*See* Table 1		8,562	5	10
Maintenance = 67,802 tons @ 2s.		6,780	4	0
		£300,110	17	10
CREDIT:				
Coke	$= \frac{67,802 \times 8.2}{20}$ = 27,799 tons @ 89s.	123,705	11	0
Breeze	$= \frac{67,802 \times 0.7}{20}$ = 2,373 tons @ 30s. ..	3,559	10	0
Tar	$= \frac{67,802 \times 18.5 \times 11}{2,240}$ = 6,160 tons @ 100s.	30,800	0	0
		£158,065	1	0

	£	s.	d.
Gross cost	300,110	17	10
Less residuals	158,065	1	0
Net cost	£142,045	16	10

TABLE 8

COST OF GAS PRODUCTION .. Calorific value 400 B.Th.U.
Annual Make @ 500 B.Th.U. = 1,095 mill. cu. ft.
@ 400 B.Th.U. = 1,368,750,000 cu. ft.

		£	s.	d.
DEBIT:				
Coal	$= \frac{1,368,750,000}{21,000}$ = 65,179 tons @ 84s.	273,751	16	0
Labour—*See* Table 1		8,562	5	10
Maintenance = 65,179 tons @ 2s.		6,517	18	0
		£288,831	19	10
CREDIT:				
Coke	$= \frac{65,179 \times 7.3}{20}$ = 23,790 tons @ 89s.	105,865	10	0
Breeze	$= \frac{65,179 \times 0.8}{20}$ = 2,607 tons @ 30s. ..	3,910	10	0
Tar	$= \frac{65,179 \times 20 \times 11}{2,240}$ = 6,402 tons @ 100s.	32,010	0	0
		£141,786	0	0

	£	s.	d.
Gross cost	288,831	19	10
Less residuals	141,786	0	0
Net cost	£147,045	19	10

It will be noted, under these conditions, that the net cost of 400 B.Th.U. gas is higher than the cost of 425 B.Th.U. gas, which further confirms, taking into account also the distribution side, the advisability of the manufacture of 425 B.Th.U. quality gas in preference to the production of 400 B.Th.U. gas.

Depending upon the price ratio of coke to coal the cost of production of blue water gas may be higher than that of coal gas, and it is still true to say that the foundation of the costs into holder is laid in the producers, as the fuel used forms a considerable portion of gas production costs.

The two main channels of solid fuel usage in gasworks are producers for carbonising plant, and steam boilers. In Scottish practice using present-day coals, and making gas of 400 to 425 B.Th.U., the weight of coke and breeze used per ton of coal carbonised will amount to from 3.5 to 3.65 cwt. as charged, with partial waste heat recovery.

This represents a considerable works annual fuel expenditure, and any future development of the carbonising process should strive to reduce the process fuel figure.

A reduction can be accomplished chiefly in two ways:—

(1) By a reduction in the producer fuel requirements of the setting. Setting design can plan an important part in this by absorbing from the heating gases the maximum amount of their sensible heat for the carbonising process. The hot-gas mechanical producer, as an integral part of the setting, has also been developed to give continuous high efficiency, as well as reduced labour costs.

(2) By decreasing the amount of excess steam to the retorts, which will result in a lower fuel tonnage to the boiler. It should be emphasised that a therm of steam costs as much to produce as a therm of gas, and further consideration should be given to the utilisation of breeze for steam raising, since, apart from producers, fuel to boilers is usually the largest single gasworks account.

I describe later experiments in the endeavour to accomplish both these savings, by gas injection when operating existing plant, but, due to widely varying local factors, each works must be taken on its own set of conditions.

Thermal Efficiencies

The thermal efficiency of gas production in vertical retorts with Scottish coals varies very slightly when making gas qualities ranging from 500 to 400 B.Th.U. using the 'steaming' process. There is, of course, a marked reduction in total thermal efficiency when waste heat recovery is not practised.

Chart No. 2 illustrates the thermal efficiency of the continuous vertical retort process, based on the same plant output of 3 mill. cu.ft. per day, as previous calculations with and without waste heat recovery.

With waste heat recovery, and allowing for the surplus steam available, the thermal efficiency increases slightly as the calorific value of the gas made is reduced to 400 B.Th.U. as follows:—

400 B.Th.U. gas	86.5% thermal efficiency	With waste heat recovery
425 ..	.. 85.29%	
450 ..	.. 84.84%	
475 ..	.. 84.82%	
500 ..	.. 84.71%	

Without utilisation of the waste gases, the thermal efficiency is appreciably reduced, being 3% lower in the case of 500 B.Th.U. gas, and fully 5% lower in the case of 400 B.Th.U. quality.

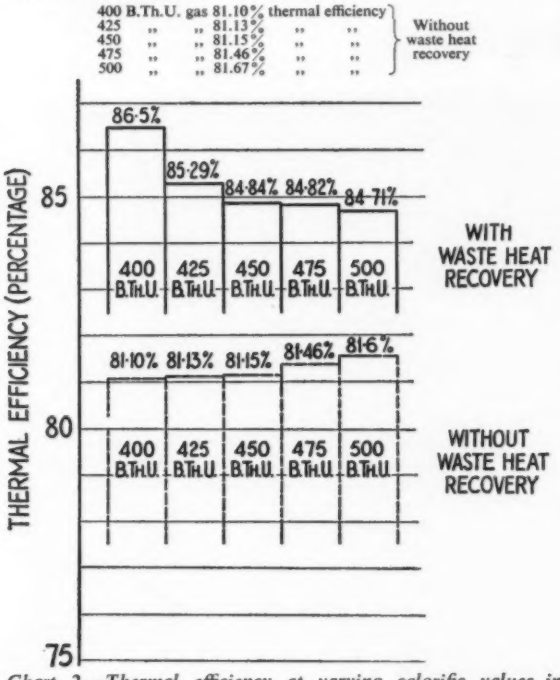


Chart 2.—Thermal efficiency at varying calorific values in continuous vertical retorts carbonising Scottish (Lanarkshire) coal.

The results are calculated on Lanarkshire gas coal with a combined ash and moisture content of 11%, with 33% volatile combustible matter, and a calorific value of 12,500 B.Th.U. per lb. gross, when making gas at 500, 475, 450, 425, and 400 B.Th.U. respectively. Calorific value of coke has been taken at 12,000 B.Th.U. per lb., tar at 170,000 B.Th.U. per gal., and credit for steam at the round figure of 1,000 B.Th.U. per lb.

The chart emphasises the advantage of waste heat utilisation and its aid to overall increased thermal efficiency. When we consider that something between a-half and two-thirds of the total heat, which goes into the process of gas production, leaves the setting, it is evident that this is a source where considerable economy may be achieved.

Overall thermal efficiency will also be improved by the use of dry coke into producers, in which I believe strongly. Dry coke will effect a reduction in fuel consumption, since the water absorbs useful heat.

The Carrier Gas Technique

In 1917, the late Mr. John West patented a process of admitting 'stripped' gas at the base of the retort for the purpose of increasing the liquid products of distillation, and it was also found that an increased coal tonnage could be processed in a given unit of plant, and that coals of wider range could be treated.

It is fitting to mention here that this method is by no means new to Scotland, for it was put into practical operation 30 years ago by Mr. George Braidwood at Coatbridge, throughout the winter of 1923-24, to obtain increased ammonia. Connections were fitted to the base of 16 retorts, and the blue water gas was metered and supplied from a Humphreys and Glasgow plant. It was also confirmed at this time that increased coal throughout could be attained. It was envisaged that if by the introduction of a carrier gas seasonable increased output could be met with plant already available, certain advantages would accrue.

Owing to the present high cost of carbonising plant, it has become necessary to obtain from it maximum gas output, so as to reduce the capital per mill. cu.ft. of gas made. The seasonal, and sometimes brief, peak loads are problems which have seriously concerned the gas industry for many years, and particularly so today with heavy capital involved, or, alternatively, high cost of gas manufacture to meet the increasing load fluctuations.

If these circumstances are to be met, and present manufacturing costs lowered or even maintained, a flexible process, which meets occasional high gas output, will be of importance to the gas industry. Therefore, a combination is desirable whereby the consumer's fluctuating requirements for both gas and coke can be matched, as nearly as practicable, in the manufacturing plant already available.

Two considerations—increased output from existing plant, and the treatment of a wider range of coals—concern us today, and some explanation of experiments attempting to achieve these aims, as compared with the steaming process, will be of interest.

The temperature at which decomposition of coal takes place is dependent on the classification of the coal, but with most Scottish coals it lies somewhat below 500°C. The distillation process absorbs very little heat, as the reaction which takes place during the evolution of gas and formation of coke is substantially thermally neutral, and it can be that, with certain coals, the reaction is exothermic —*i.e.*, some heat is evolved.

In the normal operation of carbonising coal in continuous vertical retorts, the heat necessary for the process is conducted from the combustion chambers, through the retort walls, and through a layer of coke which increases in thickness as the charge descends in the retort until the centre of the whole charge is reached. But coke, particularly in this form, is a poor conductor of heat. Therefore, in order to obtain the required, though comparatively low, temperature in the centre of the charge, the outer layers of coke must be heated to a high temperature. Hence, at the completion of the carbonising process, the majority of the resulting coke has attained a temperature of probably 1,000°C.

In normal operation, a portion of this heat is recovered by steaming, and, to a lesser degree, by preheating the secondary air circulating around the outside of the retort base. Some is lost by radiation from the retort castings, while the remaining heat is carried out of the system by the coke discharge.

Steaming in continuous vertical retorts is accomplished by the dual process of first, raising the temperature of the steam to that necessary for the water gas reaction, and, second, the reaction itself. During this conversion period, a certain amount of incandescent coke is expended, dependent on the extent of steaming practised. The amount, or volume, of coke, represents a definite proportion of the retort available for carbonisation, so that the throughput of coal is approximately in inverse proportion to the amount of water gas production effected in the retort.

While a considerable amount of heat is taken up by the endothermic water gas reaction, the water gas formed in the retort and the unconverted steam carry a certain amount of heat from the coke to the coal in the upper portion of the retort, thus contributing to the high thermal efficiency of the continuous vertical retort system.

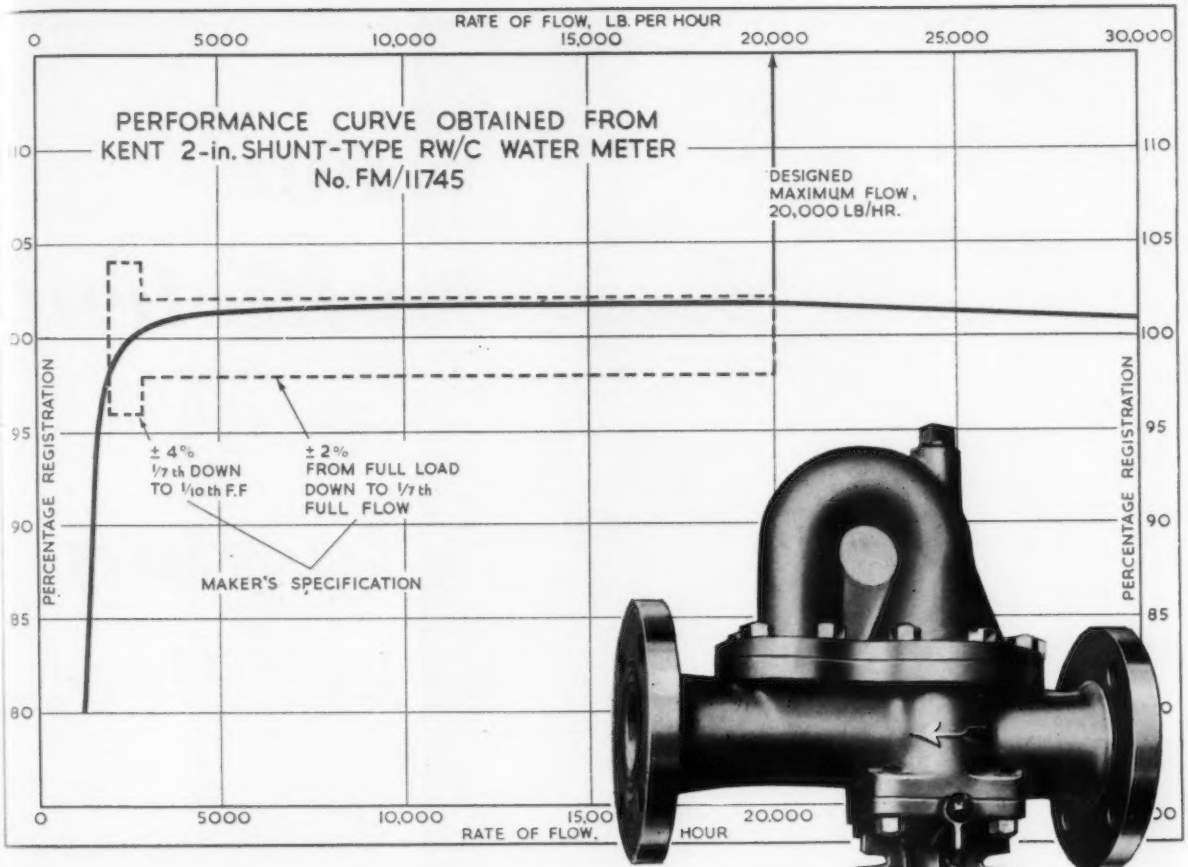
It appeared, therefore, that if a gas which did not enter into any reaction within the retort could be used as the medium for heat transference from the coke at the base of the retort to the coal at the top of the retort, certain advantages would result.

The advantages envisaged may be briefly summarised as follows:—

(1) Maximum heat would be available for transfer to the charge, and the proportion of the retort available for carbonisation would be increased. As a result, a substantial increase in coal carbonised per unit should be realised. The increased thermal output per unit of plant would reduce the cost per therm of gas produced.

(2) The flexibility of gas manufacture would be increased, since either normal steaming could be practised or water gas or producer gas could be utilised as the 'carrier gas.'

(3) The fuel consumption per ton of coal would be



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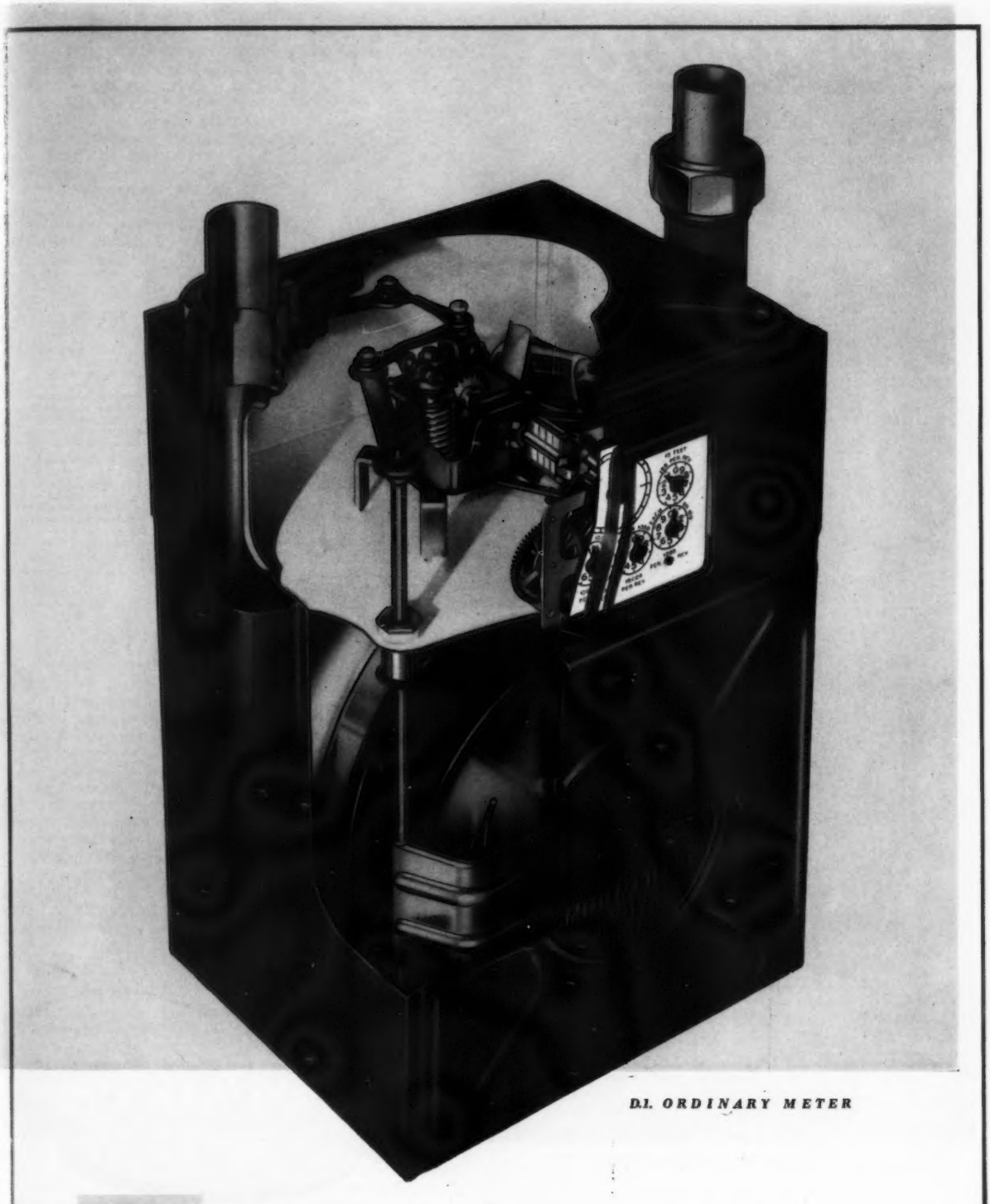

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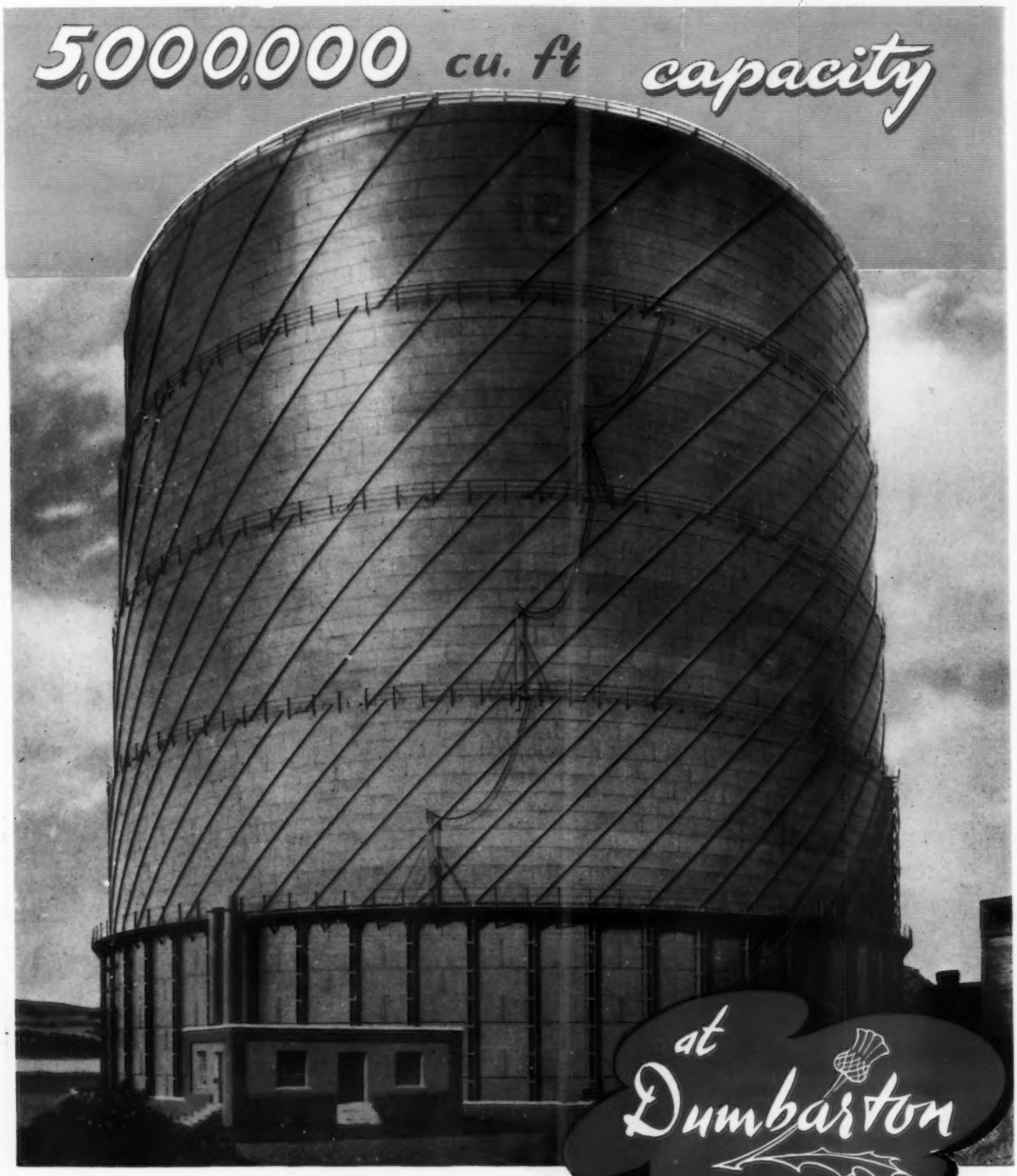

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reduced. Against this must be placed the fuel for producer gas or water gas generation, less the fuel value of the steam which would be used in the normal steaming process.

(4) Possible improvement in the quality of the coke by elimination of degradation and surface ash deposit from the normal practice of steaming.

Investigations are still in progress, but sufficient evidence has been obtained to confirm certain of the anticipated advantages.

The following are results of a series of tests conducted with Lanarkshire, Fife, and Lothian coals. It appeared from earlier experiments that the retort setting might be effectively operated with lower combustion chamber temperatures but trials of this are not included in the present series.

TESTS ON SCOTTISH COALS.
CARRIER GAS AND STEAMING PROCESSES

SUMMARY OF RESULTS

LANARKSHIRE COAL	Blue Water Gas	Steaming
Coal per retort per 24 hours, tons	10.55	4.78
Average C.V. of gas	440	440
Gas made per retort per 24 hours, cu. ft.	220,129	92,730
Gas made per ton of coal, cu. ft.	20,867	19,400
Therms per ton of coal	91.8	85.4
Therms per retort per day	969	408
Coke made per ton of coal, cwt.	12.61	11.80
FIFE COAL	**Blue Water Gas**	**Steaming**
Coal per retort per 24 hours, tons	10.3	5.42
Average C.V. of gas	462	463
Gas made per retort per 24 hours, cu. ft.	182,674	101,870
Gas made per ton of coal, cu. ft.	17,735	18,795
Therms per ton of coal	82.0	87.0
Therms per retort per day	843.9	471.6
Coke made per ton of coal, cwt.	12.1	11.6
LOTHIAN COAL	**Blue Water Gas**	**Steaming**
Coal per retort per 24 hours, tons	11.5	5.58
Average C.V. of gas	454	457
Gas made per retort per 24 hours, cu. ft.	189,820	92,082
Gas made per ton of coal, cu. ft.	16,507	16,502
Therms per ton of coal	75.0	75.4
Therms per retort per day	861.8	420.8
Coke made per ton of coal, cwt.	11.9	11.3

From these tests it will be acknowledged that the use of carrier gas in existing plant can provide considerable advantages in several directions, particularly in respect of increased production and the maximum employment of much capital already invested in the industry. Each engineer, however, proposing the adoption of the carrier gas method must, for proper assessment of its value compared with present operation, first closely consider his own particular local circumstances.

The position with Scottish coals is somewhat different from that with English coals, in that the former, with their more reactive coke, permit higher steaming conversion to the lower gas qualities. It is common to all coals, however, that the high temperature essential in the coke for satisfactory steaming conversion imposes a limit on further increase of the thermal output.

To obtain optimum results from the carrier gas process it is clear that a plant specially designed to meet the new factors involved would be desirable. Such a layout would require adequate coal tipping, breaking, and conveying equipment from the railway siding to the plant; overhead coal bunkers of twice the present capacity would be needed; coke receptacles must have double storage; and the rate of removal beneath the bench would be increased to handle the additional coke discharged. Coke storage bunkers and screening capacity would also be enlarged.

To minimise the amount of labour required for the combined process, the best position for the blue water gas plant, preferably to use the lower size coke fractions, would be within or immediately adjacent to the retort house, in order to link up the labour into one process.

As against this additional expenditure, due credit must be allowed for the fact that only half the number of retorts are required, so that when reviewing the overall picture of capital expenditure there will be some economy. The amount saved, however, would be by no means in direct proportion to the number of retorts dispensed with.

From the experiments already made with carrier gas, an assessment of the findings to date can be stated as follows:—

(1) Peak loads can be met by existing plant, thereby reducing the necessity of plant extension, and reducing the additional capital expenditure. Where the existing plant comprises vertical retorts plus carburetted water gas, the carrier method merely replaces oil by coal, and must depend on that balance and the relative capacities of the existing vertical retorts and water gas plant.

(2) The carrier gas process provides greater gas and coke flexibility. An increased tonnage of coke could be produced by this method, which, in the winter period, may be the more important peak load product.

(3) The composition of blue water gas, when used as the carrier gas, is almost unaffected in the process.

(4) There is some degradation when coal gas is recycled. The extent has yet to be determined, but it is fair to assume that degradation will be increased where higher temperatures are maintained. Less degradation occurs with the use of Tully gas, being of lower quality, though it should be borne in mind that within the Tully process itself a measure of degradation of the hydrocarbons has already taken place.

(5) The use of producer gas limits the process, since, if more than 20% producer gas is added to the total gas make, both the composition of the resultant gas and its specific gravity are adversely affected. In these circumstances, gas injection would have to be applied in a section of the plant, which would give up to 50% increased output per retort using the process.

(6) To apply the carrier gas method to existing plants, additional labour is required for the handling of larger tonnages of coal and coke, apart from the labour required for the production of the carrier gas. The additional gas output, however, may be 100%, and, under these conditions the labour cost per therm made is reduced.

(7) Experiments on Scottish coals show that the quality of the coke is not appreciably improved, and coke sizes are mainly similar to the steaming process. Coke density also remains practically unaltered.

(8) The thermal balance, compared with the steaming process, and based upon the same date as given previously for Lanarkshire gas coal, shows:—

THERMAL EFFICIENCY WITH WASTE HEAT RECOVERY

COAL:	Lanarkshire	Fife	Lothian
Calorific value	440	462	456
Carrier gas	85%	84.8%	78.2%
Steaming	88.0%	88.8%	81.4%

It will be seen that the balance favours the steaming process, depending on (a) the relative amounts of tar produced, (b) savings in producer fuel, and (c) comparative efficiencies of blue water gas production, whether internal or external.

(9) NET COST OF COAL (pence per therm).

Basic gas make, 3 mill. cu.ft. per day when steaming; including cost of coal, sale of coke, breeze and tar.

	Lanarkshire	Fife	Lothian
Carrier gas	5.46	5.70	6.74
Steaming	5.50	5.14	6.54
Increased gas made (mill. cu. ft. per day)	4.1	2.7	3.2

These can only be arbitrary figures since there are several variables, the over-riding factor in the calculations being the grade of coke used in the water gas plant, as will be seen from the following calculations, which are included to enable computation of a relative balance-sheet in respect of each works, where the carrier gas method is under consideration.

CALCULATIONS OF NET COST OF COAL

LANARKSHIRE COAL

	Water Gas	Dilution		Steaming
C.V., B.Th.U. per cu. ft.	440		440	
Therms per ton	91.8		85.4	
Coal carbonised, tons	341	£1430	155	£650
Gas made, mill. cu. ft.	7.1		3.0	
Gas therms	31.200		13.200	
Coke for sale, tons	113	£500	57	£253
Breeze, tons	20	£30	14	£21
Tar, tons	37.8	£188	15	£75
		£718		£349
Steam (1,000 lb.)	148		111	
Net cost of coal		£712		£301
Cost per therm		5.46d.		5.50d.

Additional Capital Cost:
(*a*) 3½ mill. cu. ft. blue water gas plant.
(*b*) Control and distribution of blue water gas.
(*c*) Coal and coke handling.
Reduction of Capital Cost:
C.V.R.s for gas-making plant to produce 4.1 mill. cu. ft. per day @ 440 C.V

FIFE COAL

	Water Gas	Dilution		Steaming
C.V., B.Th.U. per cu. ft. ..	462		463	
Therms per ton	82		87	
Coal carbonised, tons ..	320	£1340	160	£670
Gas made, mill. cu. ft. ..	5.7		3.0	
Gas, therms	26,200		13,900	
Coke for sale, tons	112	£500	62	£275
Breeze, tons	18	£27	11	£17
Tar, tons	38.4	£192	16.3	£81
		£719		£373
Steam (1,000 lb.)	120		110	
Net cost of coal		£621		£297
Cost per therm		5.70d.		5.14d.

Additional Capital Cost:
(*a*) 3½ mill. cu. ft. blue water gas plant.
(*b*) Control and distribution of blue water gas.
(*c*) Coal and coke handling.
Reduction of Capital Cost:
C.V.R.s for gas-making plant to produce 2.7 mill. cu. ft. per day @ 462 C.V.

LOTHIAN COAL

	Water Gas	Dilution		Steaming
C.V., B.Th.U. per cu. ft. ..	454		557	
Therms per ton	75.0		75.4	
Coal carbonised, tons ..	375	£1570	182	£765
Gas made, mill. cu. ft. ..	6.2		3.0	
Gas therms	28,200		13,700	
Coke for sale, tons	129	£574	67	£298
Breeze, tons	19	£29	12	£18
Tar, tons	35	£175	15	£75
		£778		£391
Steam (1,000 lb.)	177		138	
Net cost of coal		£792		£374
Cost per therm		6.74d.		6.54d.

Additional Capital Cost:
(*a*) 3½ mill. cu. ft. blue water gas plant.
(*b*) Control and distribution of blue water gas.
(*c*) Coal and coke handling.
Reduction of Capital Cost:
C.V.R.s for gas making plant to produce 3.2 mill. cu. ft. per day @ 456 C.V.

The process will also maintain, and to some extent increase, the nominal output of carbonising plant when using small or inferior types of coal. On this, however, when dealing with Scottish coals, we must be a little guarded, since the normal steaming process is at present dealing with small and inferior coal. We must also carefully weigh the economics of the use of poorer coals, which give a lower production of gaseous therms, as well as smaller coke. If, for the process, the carrier gas is made from the small amount of large coke obtained, such conditions could easily outweigh the advantages we may obtain from the larger plant output.

Unless the National Coal Board markets its poorer qualities at considerably lower prices than it is charging today, it will remain uneconomic to use them. A coal containing 20% ash and moisture, as some Scottish coals do today, used in whatever process, increases the capital cost of the carbonising plant by one-fifth, besides the additional costs of transport, handling, etc., and the unsuitability of the resultant coke for sale.

The gas industry is paying a high price for its coal, and it is surely entitled to receive those qualities which are best suited to it. That is the first step towards the production of a cheaper therm.

Distillation by Radiant Heat

The preponderance of weakly swelling coals throughout the world has focused attention on the urgent problem of their economic utilisation. Several countries have considerable reserves of this class of coal and its satisfactory treatment would do much to assist the well-being of those countries. Scotland is similarly placed, the production of a suitable solid fuel from these coals being the main consideration, since excessive fines are produced from them in the conventional methods of carbonisation.

In this concluding section, I propose to outline briefly a new development in the distillation of this lower grade coal by radiant heat.

Following some interesting experiments, my Company has patented a process in which coal is carbonised by exposure to heat radiated from a surface arranged over the top of a thin layer of the coal. Broken to a small size, the coal is fed to a substantially horizontal conveyor, of the tipping tray type, which passes below the heated surface. The conveyor is enclosed in a chamber from which the gas evolved is exhausted without passing through the charge. The carbonised coal falls off the end of the conveyor and passes, by way of a combined discharger and briquetter, into a secondary externally heated carbonising chamber. The briquetting and secondary carbonisation is optional so that the apparatus can be adapted to either coals which are readily carbonised in the one stage, to weakly coking coals which require briquetting to produce satisfactory coke, or to those which do not require briquetting.

It will be seen that such apparatus would be particularly useful in the production of coke from weakly or non-coking coals and to control the density and strength of the coke produced from any type of coal.

Naturally there are several problems still to be worked out in large-scale operation, but it is thought that this brief preliminary announcement will be of interest as showing that my Company is alive to the problems involved in the treatment of the weakly coking or non-coking coals with which the industry will have to deal, as supplies of true gas-making coals become exhausted.

Our report of the discussion on Mr. Poulson's paper will be published in a later issue.

INSTITUTE OF FUEL: 1954-55 PROGRAMME

The proceedings of the Institute of Fuel open in London today with the two-day conference on 'Sulphur, its Removal and Recovery from Fuels.' The first paper is that of Dr. A. Parker on the social and industrial consequences of the presence of this element in fuels. There are two papers on the effects of sulphur in the iron and steel industry, one on the occurrence of sulphur in British coals and one on a new subject—Drs. Chapman and Rhys Jones on the removal of sulphur from coal. There is a paper on sulphur in oil fuel, and the conference concludes with W. A. M. Edwards on sulphur supplies and requirements in the U.K. and trends in supply and demand. But it is the series of papers 6 to 11 which are of chief interest to the gas industry. They are:

Dr. R. H. Griffith. Sulphur removal from fuel gases by dry methods.

Drs. S. R. Craxford and A. Parker. Sulphur in Coal Gas and its removal by wet methods.

Dr. H. Schäfer. Methods for the wet purification of coke-oven gas using ammonia liquor.

Dr. H. Bähr. Desulphurisation of coke-oven gas by selective quick washing with ammonia solution and the conversion of H_2S to S_2, H_2SO_4 of Am_2SO_4.

T. H. Williams. Experiences in the operation of a Collin desulphurising plant.

A. J. Brockwell and F. F. Rixon. Removal of H_2S from producer and other industrial gases.

The provincial sections are also taking a great interest in this subject. The North Western Section is to devote a whole day on December 8 to Dr. Parker's opening paper, R. W. Evans on S in Steelmaking, A. M. Wandless on the occurrence of S in British coals, D. A. C. Dewdney and H. Jagger on S in fuel oil, and the final paper on supply and requirements of S. The Section has also arranged a joint meeting with the Manchester Section of the Institution of Gas Engineers on January 14 to discuss the papers on dry and wet methods for the removal of S from gas.

South Wales Section is to hear Dr. J. G. King on December 3 on conclusions reached at the London Conference, Scotland is to discuss Dr. Bähr's paper on October 8, and T. H. Williams's paper on January 21—both dealing with washing methods for desulphurising coke-oven gas—and the Midland Section is to discuss Dr. Parker's opening paper on December 16.

Other papers of more or less direct interest to gas engineers are E. M. Edwards and collaborators in London on February 10 with the intriguing title 'Wales Gas Board—Integration of Fuel Supplies.' Dr. F. J. Dent on 'Methane Production' at Derby on February 3 and on 'Advances in Complete Gasification' at Stoke on March 22, H. Bardgett on the 'Carbonisation of Blends of Coal to Produce Metallurgical Coke' at Newcastle on January 10, Dr. G. B. Milner on 'Producer Gas' at Middlesbrough on March 28, Dr. D.

McNeil at Glasgow on November 1 on the 'Constitution of Coal Tar,' and Dr. A. Whitaker at Edinburgh on December 3 on the 'Constitution of Coal.'

Gas and coke utilisation will be dealt with or touched upon by the two papers on the development and use of the calorimeter building at the Fuel Research Station, by W. F. B. Shaw and J. M. McHugo in London on March 24. 'Selection and Use of Fuels in a Modern Engineering Heat Treatment Department' by H. Oxley in Birmingham on March 15, 'Smoke Abatement' by Dr. A. C. Monkhouse in Newcastle on November 8 and at Cardiff on February 4, 'Some Aspects of the Problem of Air Heating' by J. F. S. Kistruck at Edinburgh on February 24, and possibly by 'Fuel Economy and Breweries' by J. Hall at Birmingham on February 15.

The Chairman of the Midland Section, Mr. E. B. Gibbons, has chosen for the subject of his address from the chair on October 19 'Fuel and the Ceramic Industry.' Gas turbines will be specifically dealt with by F. Hickson in Manchester on November 10, and H. Farrington in Birmingham on November 16, while applications of the gas turbine in industry are to be discussed at a joint meeting of the East Midland Section with the Loughborough College Scientific Society at the college on March 18.

Atomic energy is to be dealt with by J. C. C. Stewart at Liverpool on January 27 and by Dr. P. McNair at Swansea on March 4, while the annual general meeting of the East Midland Section is to be addressed by Prof. J. Rotblat at Nottingham on April 21 on 'Nuclear Power.'

Dr. W. A. Macfarlane, Director of the National Industrial Fuel Efficiency Service, is to address the South Wales Section at Cardiff on April 1 on the start of that service, and he is to open the programme of the North Western Section at a joint meeting with the National Smoke Abatement Society in Manchester on October 27 with 'An Account of American Fuel Research and the Work of the New Fuel Efficiency Service.' There are several other papers on fuel efficiency and economy in selected industries.

Education is the subject of a lecture to be given by Professor A. L. Roberts at the University, Bristol, on March 3 to a joint meeting of West of England members and the Bristol Section of the Society of Chemical Industry, with the title, 'The Fuel Scientist Training and Using Britain's Greatest Asset.' There is also to be a lecture by Professor F. H. Garner and Dr. R. Long on 'Training of the Chemical Engineer in Fuel Technology,' following a visit of the Midland Section on April 20 to the laboratories of the Chemical Engineering Department, Birmingham University.

East Midlands Tariffs Revised

Incentive to Increase Consumption

A gas tariff revision designed to raise additional annual revenue by £500,000 was proposed by the East Midlands Gas Board at a meeting of the Gas Consultative Council in Nottingham on September 27. The proposals received unanimous approval and will come into effect early in November.

In parts of the Board's area, domestic gas prices will be raised by between 4.7 and 7.5%, although in no cases will prices be raised by more than 1d. per therm. At the same time, by offering cheaper gas at an earlier stage, 25% of the area's domestic consumers—some 250,000 people—will get gas at cheaper or unchanged prices. Of the Board's non-domestic consumers 53% will pay less, 22% the same, and only 25% more. The 10% constant load discount will continue to apply to those non-domestic consumers qualifying.

Since last December when the Board reduced prices it has faced additional expenditure of approximately £1 mill. per annum. This is made up of increased wages and salaries £270,000, freight charges of £120,000, increased prices of coal and coke oven gas less coke increase amounting to £200,000, increased depreciation £200,000, loss of revenue from the tariff revision last December of £160,000, together with a strong possible salaries award of £51,000.

The £500,000 not covered by these proposals will, it is hoped, be met by extending sales and by further improvements in efficiency.

In a statement to the Council, Mr. Sydney Smith, Chairman of the Board, said that since the Council last discussed tariffs in December, 1953, the Board had had to shoulder the burden of sharply rising costs. In all, their annual expenses had increased since last year by over £800,000 per annum, to which must be added the loss in revenue arising from the price concessions made in December last, amounting to £160,000, giving a total of nearly £1 mill. per annum.

At the meeting of the Council held on May 4 last, the Board had pledged itself not to increase gas prices for a period of six months. With the end of this period approaching, it had become increasingly clear that the additional costs were much too heavy wholly to be absorbed by a combination of improved operating efficiency and sales expansion; and it would have been rash to assume that current inflationary trends would be halted.

The outlook was not entirely dismal, however. From 1956 onwards the substantial replacement of gas manufactured in the Board's works by coke oven gas would produce valuable economies, but these would be insufficient to offset more than a portion of their cost increases.

From an administrative point of view, the easiest way to raise extra revenue would have been to impose a flat all-round percentage increase on all prices. But to do so would have discouraged rather than encouraged sales of gas, and if its business was to expand it must offer some incentive to as many consumers as possible.

The proposals had been drawn up to provide the utmost possible incentive for increasing the use of gas by domestic and non-domestic, consumers alike. In other words, the proposals called for the establishment of new block prices at the levels of consumption most likely to encourage additional business. This was in line with the Board's consistent policy of more accurately apportioning the costs of supply, and by means of more promotional tariffs, of expanding their business in order to spread its fixed costs over a larger volume of gas sales.

Mr. Smith emphasised that the £500,000 additional annual revenue they hoped to raise was little more than one half of the full increase in annual costs imposed upon the Board since the Council last discussed tariffs. The remaining £500,000 they hoped to absorb through expanding sales and by further improvements in administrative and technical efficiency. The present and new blocks are: Present (therms per quarter) 0-30, 31-60, 61 and over; new blocks are 0-25, 26-50, 51 and over.

This change of structure offers an inducement to many consumers to expand their consumption and so to take advantage of the cheaper gas in the second and third blocks.

Coal Science Lecture

In the British Coal Utilisation Research Association's quarterly *Gazette* is reproduced the address by the President, Sir Charles Ellis, to the 17th annual general meeting, 1954.

Emphasised is the announcement, made during his address, that Professor D. W. van Krevelen would deliver the B.C.U.R.A. third coal science lecture on October 13. He has chosen as his title: 'The Problem of Coal Constitution.' Professor van Krevelen has published some 60 papers on subjects covering chemical engineering, fuel and gas technology and coal chemistry, including the chemical constitution and physical structure of coals, solvent extraction and pyrolysis, etc.

Work Before Pleasure

Employees at the Warwick works of Thomas De La Rue and Co., Ltd. postponed their annual holiday recently to meet a snap order for 100 infra red heating panels for the Pressed Steel Company.

The order, placed through the Scottish Gas Board, was received only a day before the works was due to close but, despite the lateness of the hour, arrangements were made for certain workmen to stay on and the panels were ready in less than a week. The speedy service resulted in a second urgent order, this time for an additional 150 panels.

At the same time the Company arranged for an urgently needed boiler to be delivered to a block of flats in Bournemouth, again well ahead of normal delivery schedules.

Wales and Monmouthshire Section

Annual Meeting at Swansea

The Wales and Monmouthshire Section of the Institution of Gas Engineers held its fifth annual general meeting at the Y.M.C.A. Llewellyn Hall, Swansea, on September 22, when Mr. K. E. Tiddy (Carmarthen), on the completion of his year of office as Chairman, inducted Mr. J. H. Chapman (Swansea) as his successor. An agenda of 18 items was followed by the official luncheon at the Mackworth Hotel, and in the afternoon the members were the guests of the Anglo-Iranian Oil Company for an interesting visit to the National Oil Refineries at Llandarcy, a few miles outside the town. The proceedings opened with a civic welcome. Both the Mayor and the Deputy Mayor were away at conferences—one in Edinburgh, the other at Bournemouth—and the members were, therefore, welcomed by Councillor D. C. Concannon, who was himself attached to the Swansea undertaking of the Wales Gas Board. Mr. T. Mervyn Jones (Chairman of the Wales Gas Board) and Mr. R. S. Snelling (Deputy Chairman) were present at the opening, but had to leave early on Board business.

MR. TIDDY extended a welcome to the Chairman and Deputy Chairman and also to Dr. W. T. K. Braunholtz (Secretary of the Institution), Dr. A. B. Badger (Industrial Relations Officer, Gas Council, and a native of nearby Llanelly), and several representatives of the Anglo-Iranian Oil Company.

MR. J. POWDRILL, M.B.E. (Hon. Secretary) reported apologies for absence from Mr. Geoffrey Lloyd (Minister of Fuel and Power), Mr. J. S. Smith and Mr. O. Francis (Ministry of Fuel and Power), Mr. W. K. Tate (President of the Institution), and the chairmen and secretaries of other district sections.

Reference was made in the report of the Management Committee to the death during the past year of two members, Mr. A. D. Howells (Abergavenny) and Mr. A. F. Topley (London), and silent tribute was paid to their memory.

Education Committee Reconstituted

It was reported that the total membership of the Section was 163, comprising six Honorary Members and 157 members. In accordance with revised regulations the District Section Education Committee had been reconstituted. Matters which had received consideration included proposals for Associate Membership examination courses, the Summer School of Science and Technology at Swansea, correspondence courses in advanced subjects, applied chemistry courses, and gas salesmanship and consumer service. Under the last-mentioned heading, 25 persons from the South Wales area attended classes at Cardiff, and nine of those studying already held qualifications justifying exemption from the ancillary subjects. One external student sat for the examination.

Dealing with the Octavius Thomas Memorial Fund, Mr. Powdrill said the Management Committee recommended that a prize of £5 be presented to Mr. W. M. Moxley, Technical Assistant to the Wales Gas Board's Mechanical Engineer, as the first recipient of the Octavius Thomas Memorial Prize. The Section had, said Mr. Powdrill, given the Institution a capital sum of approximately £300, and it had now been decided to disburse the Fund by way of a prize to the most worthy student of the year. The Committee particularly requested members to send full particulars and recommendations in respect of students whom they wished to be considered for the prize to the Hon. Secretary not later than August 30 in each year. The full co-operation of all members was sought to ensure that the prize went to 'the most worthy student of the year taking a course in the Institution of Gas Engineers' Education Scheme.'

In presenting the report, Mr. Powdrill mentioned that it had been found impracticable to hold sectional meetings during the year, but it was hoped to have some meetings with kindred organisations, particularly the Institute of Fuel, in the coming year.

The report was approved on the motion of MR. I. G. JENKINS, seconded by MR. D. E. WEST.

The Octavius Thomas Prize

MR. TIDDY then made the presentation to Mr. Moxley who, he said, began his career as a gasfitter's helper at the Abertillery undertaking in 1943 and took up evening studies in a general engineering course, first at the Abertillery Institute and later at the Crumlin Technical College, where he was successful in obtaining a scholarship to Cardiff University. Before he could take advantage of the scholarship he had to study English and French in order to obtain matriculation exemption; at the same time he obtained his first year Higher National Certificate in Mechanical Engineering. He obtained his B.Sc. degree in engineering in 1953, and was continuing his studies to obtain his Membership of the Institutions of Mechanical and Gas Engineers.

On the proposition of MR. S. L. FILER, seconded by MR. M. S. GASKILL, the Section unanimously confirmed the recommendation of the Management Committee that a grant of £20 be made to the Institution Benevolent Fund.

DR. W. T. K. BRAUNHOLTZ, as Hon. Secretary of the Benevolent Fund, thanked the Section for its continued generous support of a most worthy cause. The need, he said, was as great as ever, and he appealed to individual members who had not already done so to give their annual subscriptions under covenant to enable the Fund to recover income tax and thus augment its total income.

The meeting then proceeded to the election of officers and confirmed the Management Committee's recommendations as follows: *Chairman*, J. H. Chapman (Swansea); *Senior Vice-Chairman*, J. F. Lloyd (Wrexham); *Junior Vice-Chairman*, A. H. Dyer (Newport); *Hon. Secretary*, J. Powdrill (Cardiff); *Hon. Treasurer*, O. P. Cronshaw (Rhyl); *Auditors*, H. Allerton (Llandudno) and S. L. Wright (Cardiff).

MR. E. ABLETT, proposing the election of the Chairman, said Mr. Chapman and he had been close colleagues for 30 years and had worked together intimately, closely, and amicably. They had together fought the difficulties of the inter-war years and the war years, with their heavy air raids, and with the post-war years, and had tried to cope with the uncertainties which arose from the shadows of grid supplies and nationalisation. In all those circumstances he had had ample opportunity to assess the value of Mr. Chapman as a loyal friend and his work as a technical colleague. He was a glutton for work and would apply to the duties of the office those same characteristics that he had shown in his everyday activities.

MR. A. PICKARD (Swansea) warmly supported the proposal, and Mr. Tiddy then formally inducted Mr. Chapman into the chair and invested him with the badge of office.

MR. CHAPMAN modestly returned thanks for the honour and proceeded to present a silver salver to Mr. Tiddy in appreciation of his services in the chair in the past year.

MR. TIDDY responded and paid tribute to the support he had received from Mr. Powdrill, as Secretary, and from the members generally.

MR. S. L. WRIGHT proposed, and MR. W. K. PARSONS seconded, the election of Mr. Lloyd as Senior Vice-Chairman; and MR. J. F. RUST proposed, and MR. C. H. SINGLETON seconded, Mr. Dyer's election as Junior Vice-Chairman.

To fill vacancies on the Management Committee caused by retirements by rotation the meeting appointed Mr. W. K. Parsons (Rhos), and Mr. I. Thomas (Aberystwyth), and Mr. D. E. West (Merthyr Tydfil).

MR. F. G. SYMON, General Manager of the Central Division, Southern Gas Board, then reintroduced the paper on 'Centralised Control of a Gas Grid,' which he presented at the annual meeting of the Institution of Gas Engineers at Bournemouth in June, and after discussion—necessarily short because of lack of time—he was thanked on the proposition of MR. S. L. WRIGHT, seconded by MR. G. FITTON.

The Official Luncheon

Mr. Chapman afterwards presided at the official luncheon at the Mackworth Hotel, at which DR. W. T. K. BRAUNHOLTZ proposed the toast of the Wales and Monmouthshire Section, which he said was rapidly approaching its jubilee. The original 'Wales and Monmouthshire District Institution of Gas Engineers and Managers,' was founded in 1905, with Thomas Canning as its first President and Octavius Thomas as its first (and for many years) Secretary. It was right that professional men should take reasonable pride in their profession, and it had always been recognised in Wales that one of the primary functions of a professional institution was to ensure that the highest possible standards were maintained in the profession. He congratulated Mr. Tiddy on the completion of a very successful year of office, and offered Mr. Chapman his best wishes for the coming year.

MR. CHAPMAN, responding, recalled that Octavius Thomas was followed in the office of Secretary by Mr. E. M. Edwards, now a member of the Wales Gas Board, who had worthily upheld the traditions established in the earlier days.

MR. E. M. EDWARDS proposed the toast of 'The Town and Prosperity of the County Borough of Swansea.' He referred to the courage and fortitude shown by the people of Swansea during the heavy air attacks of the war years, and particularly to the work of the Swansea Gas Light Company in striving

to maintain supplies in times of extreme difficulty. The gas undertaking started 133 years ago and was now one of the major undertakings in Wales. One effect of the development of the South Wales grid was that Swansea would be assured of an adequate supply for its growing domestic, commercial, and industrial uses.

COUNCILLOR D. C. CONCANNON responded and mentioned that a further stage in the reconstruction of the town was about to begin.

MR. J. F. LLOYD, Senior Vice-Chairman, proposed the toast of the visitors, for whom PROFESSOR L. J. KASTNER, Chairman of the South Wales Branch of the Institution of Mechanical Engineers, responded.

In the afternoon a visit was paid to the National Oil Refineries at Llandarcy, one of the three major refineries in Great Britain which today make the Anglo-Iranian Oil Company the biggest oil refinery in Great Britain. The Llandarcy plant can handle 4 mill. tons of crude oil yearly, making with that at Grangemouth on the Firth of Forth and the new refinery on the Medway which began operations last year, a total of 10½ mill. tons, or more than half the oil consumption of the United Kingdom. The South Wales installation is of particular interest to Wales gas engineers in that it is the source of the butane used in the butane/air distributed at Whitland.

Major W. S. Bryan conducted the party round the works, and at the training centre Mr. P. F. Ellis, Training Superintendent, gave a brief talk on the basic principles of oil refining, followed by a cartoon film illustrating the development of oil utilisation. Tea was served in the staff canteen, and thanks were expressed to the Company for its hospitality.

Irish Gas Association

This year's meeting of the Irish Gas Association was under the presidency of Mr. R. F. Pollock, Managing Director of the Enniskillen Gas Company. It took place on September 22-23. Charming as Enniskillen is, it does not offer ideal facilities for such a large gathering as regularly meets for this popular annual function, and it was therefore decided to make headquarters over the border at the Great Northern Hotel, Bundoran, Co. Donegal. The first day, devoted to the business meeting and a golf competition, was blessed by sunshine and perfect views of Donegal Bay, but rain somewhat interfered with the arrangements made for the excursion on the Thursday.

Business Meeting

In the absence through illness of the Mayor of Enniskillen, the gathering was welcomed by MR. H. W. WEST, M.P., High Sheriff of Enniskillen, who remarked that on such an occasion all were anxious that contentions and politics should be forgotten. In the course of his speech he made the interesting suggestion that means might be found to ballast with cattle on their return journey the coal boats which came from England.

The President followed with a brief welcome to the visitors, and expressed the hope that the party spirit should permeate the gathering. He then proceeded to deliver his Presidential Address, which we published on p. 781 of our September 29 issue.

The immediate Past-President (Mr. Jack Ronan, Waterford) being unfortunately absent, Mr. George Walmsley (Londonderry), the Senior Past-President, presented the Medal of Office to Mr. Pollock, at the same time warmly congratulating him on his address. Mr. Walmsley took the opportunity to remark that it seemed inequitable that England should enjoy Irish commodities at Irish home prices, while Ireland had to bear the whole freight on English coal.

Mr. Pollock, responding, said that he had enjoyed every minute of his year of office. Mr. Robertson, the Secretary, had done the work.

Mr. Robertson then presented the report of the Council, and announced that MR. S. L. DOYLE, Secretary of the Cork Gas Consumers' Company, had been elected President for the ensuing year. The papers by Mr. J. E. Tully and Mr. N. J. Robertson (see pp. 782-790 of our issue of September 29) were then presented. Thereafter, the President offered a very hearty welcome to Mr. W. K. Tate, President of the Institution of Gas Engineers.

MR. TATE, in acknowledgment, said how delighted he was to be with them as the official representative of the parent body. He went on to make some comments on Mr. Tully's paper, though he confessed that he had never operated a Tully plant and had, in fact, seen only one in operation. His, Mr. Tate's, whole outlook was coloured with pessimism over coal, the availability and quality of which was steadily deteriorating. They were now forced to take so much rubbish in proportion to the amount of the particular coal they wanted. His opinion was that large scale carbonising plants were likely to wane in popularity and that new processes must be found. At present the coke market was good; further, the trouble with complete gasification plants was that they were selective of coals. What they needed most was a process for gas production from non-caking coals and non-selective plants. He considered that the fluidised bed type of plant gave the greatest promise. As far as coal prices were concerned, he remarked that the Coal Board would continue to charge what the traffic would bear.

Though he knew little of the Tully process, he considered that the paper was one of the best descriptive ones he had seen, for after reading it he felt he knew all about the system. He was critical of the C.W.G. costs given by Mr. Tully; in Portsmouth he could not approach them. They themselves were converting some of their W.G. plants to fuel oil, and were hoping thereby to save a penny a therm.

Social Events

The Annual Dinner was held in the evening and was largely attended. Afterwards there was dancing in the hotel. On the following day, an excursion by motor coach had been arranged to Enniskillen, where luncheon was served in the Town Hall. On the way, the party stopped at the Ballyshannon Hydro-Electric Station, where visitors are welcomed without fee and can inspect the plant under expert guidance. After lunch, the party visited the Taylor-Woods nylon works; but the weather interfered with a launch trip to Devenish Island. The meeting, however, was voted a great success, and the party dispersed next day with hearty good wishes to Mr. Doyle for his year of presidency.

Eastern Juniors at St. Albans

The Presidential Meeting of the Eastern Junior Gas Association was held at St. Albans on September 25, when a large number of members and their ladies availed themselves of the invitation of the Eastern Gas Board and Mr. T. C. Battersby, General Manager of the Watford Division. The retiring President (Mr. F. J. Denny, Ipswich) inducted his successor, Mr. R. F. Robinson (Constructional Engineer, Watford Division) into the chair, and those on the platform included Mr. J. H. Dyde (Deputy Chairman of the Eastern Gas Board), Mr. W. A. Evetts (Divisional Engineer, Watford, and Chairman of the Eastern Section of the Institution of Gas Engineers), and Mr. Battersby. Expressions of regret at inability to attend were received from Sir John Stephenson (Chairman of the Board), Mr. R. H. Epps (Secretary), and Mr. J. Hunter-Rioch (General Manager of the Cambridge Division).

On the proposition of MR. R. W. HILHAM, seconded by MR. F. J. DENNY, the Association agreed to donate five guineas, the same as last year, to the Benevolent Fund of the Institution of Gas Engineers.

MR. ROBINSON delivered his Presidential Address (an abstract of which will be published in a later issue). A cordial vote of thanks was accorded to him on the proportion of MR. F. G. COX (Senior Vice-President), seconded by MR. E. S. DENNIS (Junior Vice-President). Mr. Cox referred to the exceptionally able way in which Mr. Robinson presided over a recent meeting of the Joint Council.

The PRESIDENT presented his predecessor with an illuminated address, which was suitably acknowledged by Mr. Denny, and the meeting ended with a short speech of welcome by the President to the principal visitors.

Members and their ladies were afterwards entertained to luncheon at Ashwell House.

MR. J. H. DYDE proposed the toast of the Association and said Mr. Robinson was the eighth President, the Association having been formed at Cambridge in 1946. As Hon. Secretary, Mr. Hilham had steered the ship on its early voyages, and he had now handed over to an able successor in Mr. H. E. Wilks, of Watford. Membership had grown from 68 to 145. Growth in membership was not the real criterion of the value and success of the Association; its value lay in the quality and work of its members, and from that point of view several of the members had distinguished themselves, not least the President, who was

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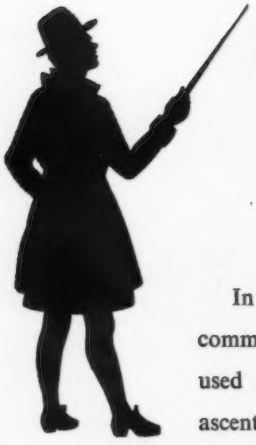

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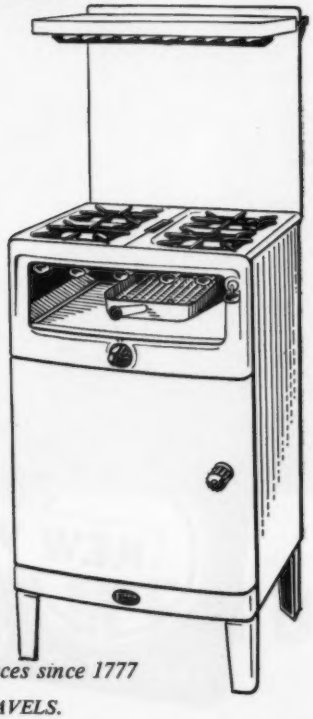

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warded the Society of British Gas Industries silver medal in 1952 for his paper on 'Some Aspects in the Design and Construction of Gasworks.' Mr. Robinson entered the industry at Watford and St. Albans, and but for a short period at Ilfracombe he had spent all his 23 years of professional life there.

MR. ROBINSON briefly responded and welcomed the principal visitors.

MR. R. W. HILHAM proposed the toast of the Eastern Gas Board and, speaking from his intimate experience as Secretary of the Association, he expressed warm appreciation of the help and encouragement they had received from the Board.

MR. BATTERSBY replied to the toast and congratulated the Juniors on what they were doing for the Board in particular and the industry in general. They were practising gas engineers and as such they were fully alive to the great future which was unfolding for the industry. They were on the brink of new discoveries in complete gasification, catalytic oil processes, perhaps natural gas, and certainly new integration problems, all of which were of particular importance to the Eastern Gas Board, in whose area there had been a greater increase in the price of coal than anywhere else in Great Britain. During the last five years they had been laying the foundations of a new gas production and distribution system, and it was to the Juniors that they would look to bring it to fruition.

After lunch a visit was paid to Hatfield House where, after a tour of inspection, the visitors were entertained to tea at the Old Palace Restaurant near by.

WAGES AND INDUSTRIAL RELATIONS

Mr. John A. Drake, J.P., Managing Director of Drakes, Ltd., Halifax, and Chairman of the Engineering and Allied Employers' West Riding Group, referred to wage structures. industrial relationships, and exports in the face of growing competition in a speech at a dinner to industrial correspondents of the British Press at Halifax on September 20.

From the end of the war until 1953, he said, the engineering industry was besieged by a large number of customers clamouring for goods: for some it meant that they were so busy fulfilling orders that they had little time to reorganise their factories on up-to-date lines. And Continental competitors were building new factories over the ruins of the old. But on the whole those were fairly prosperous times.

It was a different story today, for we were faced with customers not begging for their orders to be fulfilled but who were just prepared to meet us and discuss prices.

Generally speaking, if one could produce at the right price and with delivery right, one got the order. But an engineering management, to give a firm answer, must know what was likely to happen between acceptance of the order and the delivery date.

What was one to do if, though a wage settlement had just been reached, one had a pretty good idea that another wage claim was round the corner? It was this instability which had worried all employers in the engineering industry. It was no longer possible to carry increased costs without increasing prices. There had been a recent demand by the trade unions for a revision of the wages structure in such a way that it would mean an increase in wages all round. The claim had been made on the grounds of increased profits and increased production.

'As to distributed profits, rises in dividends among large companies always hit the headlines but should not distract attention from the hundreds of small firms, employing up to 300 workpeople, a majority of firms in our federation, and who form the backbone of the engineering industry.

'They have only been paying their way. Let those who tie wage claims to profits reflect, too, that profits can turn into losses, and then, I imagine, they would not like the same argument to apply.'

Of increased production, Mr. Drake said that the greater part of engineering workers' wages were tied to production by piecework rates and various types of bonus schemes: if they produced more they must inevitably earn more. No one, least of all an engineering employer, was going to grumble at that. He stressed that there were other increasing costs which the engineering employer had to face—an almost continual uncertainty about the cost of coal, gas, electricity and transport, uncertainty about the amount of the increase in the cost of these commodities, and the ever-increasing cost of paper-work in their offices; costs of complicated systems of accountancy and P.A.Y.E., which fell particularly heavily on the small and medium-sized firms.

'But do not think this is a partisan moan,' he said. 'We are all in the same boat and we sink or swim together. The Welfare State is based on the ability of us, as a nation, to earn it. It is wishful thinking to imagine that increased pensions, holiday payments, children's allowances, health services, education and the rest of these admirable things can be maintained if we cannot earn them overseas.'

'LIVE WATER' DEMONSTRATION

The South Western Gas Board, in conjunction with the Parkinson Stove Co., Ltd., held a reception at Bristol on September 23 for the purpose of staging a demonstration of the new Parkinson 'Live Water' washing machine on its introduction to the area. The guests were about 300 representatives of women's organisations, and seven machines were specially connected up in order that the visitors could see them in action.

Mr. James Carr, Deputy Chairman of the Gas Board, opened the proceedings, and he was followed by Dr. Rees Jones, newly appointed General Manager of the Parkinson Stove Co. and the technical director responsible for the development of the machine, which has no agitator, all movement of the clothes being by 'live water.' The Lady Mayoress of Bristol, Mrs. Gilbert G. Adams, was guest of honour, and a popular speaker was Miss Phyllis Smale (better known in the West of England as the B.B.C.'s 'Mrs. Luscombe'). The demonstration was given by Mrs. Joy Smith, of the Parkinson Stove Co., with the commentary by Miss Joan Langley, Chief Home Service Adviser to the Board.

Left to Right: Mr. James Carr, the Lady Mayoress of Bristol, 'Mrs. Luscombe,' and Mrs. Joy Smith inspecting the double blanket used for the first demonstration.

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COMPLETE GASIFICATION AT KIRKCALDY

A new Tully carburetted complete gasification plant of 1 mill. cu.ft. per day capacity has recently been completed by the Tully Engineering Co. Ltd., at the Kirkcaldy undertaking of the Scottish Gas Board. The completion of this installation is significant in that it is claimed to be the largest completely automatic total gasification plant in existence in the industry. There are several other 1 mill. cu.ft. per day plants in operation, but this is the only completely automatic installation. A carburetted complete gasification plant was installed at Kirkcaldy in 1949. This is a hand clinkered plant with a nominal output of 750,000 cu.ft. per day, and has automatic mechanical operation and overhead storage bunkers. The plant has been in continuous operation since its installation as a base load plant, operated to meet the daily peak load. The average working results over the last three years are:

Fuel.—Coal; Comrie, Blairhall, Kinniel. (Comrie forms approximately 45% of the total coal used.) Analysis of 'Comrie Doubles':—Moisture, 5.08; Volatile matter, 31.25; Fixed carbon, 57.17; Ash, 6.50; Swelling index, 1-2. Coke from C.V.R. plant: Average fuel ratio, 15% coke; 85% coal.

Thermal Yields.—Coke (as fed), 160 therms per ton; coal (as fed), 150 therms per ton; oil, 1.15 therms per gall.

Traditional Design

The new plant now going into operation follows the traditional Tully design but incorporates certain new features. The plant includes annular boiler, automatic clinkering, multiple retort generator, automatic mechanical control, steam driven positive blower, overhead storage bunker, skip hoist, waste heat boiler, washer scrubber, and water type condenser.

The plant operates on the normal Tully complete gasification cycle consisting of blow, purge, up run with oil, up run without oil, down run, and up run purge. The installation is provided with a twin retort with chequered heating flues, the design of which resembles the usual vertical retort design. The retorts are fed from the main coal reservoir which in turn, is fed from a single charging valve. A common distillation gas offtake is provided at the top of the coal reservoir, which passes the distillation gas into the washbox.

The generator is provided with a automatic water sealed grate consisting of a set of heat resisting cast iron alloy grate bars supported on the grate side walls. The complete grate is supported on a revolving base plate, which also carries the ash pan and driving ratchet. The air inlet and gas outlet connection is made through a centre seal and the dip pipe for this seal is supported from the top of the grate walls. The grate and ash pan are rotated by means of a 'Lockheed' rotary grate drive unit which operates on a ratchet ring fixed to the base plate.

Ash and clinker are removed by a plough fixed to the annular boiler. Auxiliary ploughs are fixed on the base of the crusher skirt to assist in removing ash from under the skirt and bringing it into the path of the main plough. The ash rises up the main plough plate and is discharged over the ash discharge chute. A guard plate is fixed to the annular boiler about the ash discharge chute to prevent the ash from coming in contact with the annular boiler lagging.

The top section of the grate is formed from a series of grate bars that are cantilevered from the grate side walls and retained by a centre crown piece that is surmounted by a capping piece. The whole of this equipment is constructed from heat resisting cast iron alloy. The grate bars incorporate air and gas vents that distribute the air throughout the fuel bed area and allow the down run gas to pass out of the generator base. These vents are of 'venturi cross-section and are arranged to prevent ash from falling into the air-gas connection and centre seal.

The grate side walls support the grate bars and are made up of five sections that form an eccentric pentagon. The eccentricity of the grate walls causes the clinker to be crushed on the crusher skirt attached to the annular boiler.

The carburetting and superheating vessels are of the usual design packed with interlocking chequer bricks. The oil spray for the carburetting vessel is provided with automatic steam purge. The washboxes for the distillation gas, up run gas and down run gas incorporate a swing disc valve seating on the under side of the dip pipe. This valve is equivalent to a water cooled hot gas valve and controls the flow of the various gases from the plant. The washing medium for the washboxes enters through sealed connections and the overflow is discharged through the gas outlet main to the washer scrubber. Thus primary cooling and washing of the gas is effected and the outlet main kept clear of heavy tar and dust deposits.

The waste heat boiler is of the horizontal, multitubular, fire-tube type with a refractory lined admission chamber. The smoke box of the boiler is provided with a large quick opening door to facilitate tube cleaning. Both admission chamber and smoke box are provided with dust discharge valves.

The washer scrubber is of the usual type, having a perforated bubbling hood for the washer section and packed with 4 in. diameter Raschig rings which are sprayed with the scrubbing medium. The water tube condenser is of the centra-flow, four-pass type with automatic cooling water control. The liquor overflow from the washer scrubber, together with condensate overflow from the condenser, pass into a large seal pot and from thence to the tar separating tank. The liquor supply for the washbox and washer scrubber is taking from the tar separator. The automatic mechanical operation is controlled by means of a Tully No. IIIa mechanical operator. This operator is a seven cam machine, with five main cams and two minor cams. The minor cams control the oil and blower control valves.

The timing mechanism provides six phases per cycle and controls a clutch in the cam shaft driving mechanism. This timing mechanism is extremely flexible and allows the total cycle time to be adjusted from 150-300 seconds in steps of five seconds. It also allows the duration of any phase to be adjusted without interfering with the duration of any other phase. The adjustment of each phase time and consequently the total cycle time can be made without changing any components on the machine and can be carried out in a few seconds. The machine can be manually operated in case of an emergency and is provided with a standby steam engine drive.

The installation incorporates instruments for measuring the flow of air, steam and oil, together with pyrometers for measuring the temperatures at various points throughout the gas making plant. Water gauges are also provided for measuring the pressures throughout the gas making plant and pressure gauges to measure the pressure of the waste heat boiler, annular boiler, works and process steam pressures together with a pressure gauge for measuring oil pressure. All the instruments are grouped on a central control panel and this control panel incorporates all the necessary hand controls for the plant, including the main steam stop valve and auxiliary air supply controls. The mechanical operator is housed behind the control panel with suitable doors in the panel to give access to the various controls for the machine.

Plant Performance

The plant has recently been tested under the general conditions as laid down in the BS. 1784: 1951, and the following results obtained:—

Mean output per 24 hour day—1,043,000 cu.ft. at 60°F, 30″ Hg.

Mean calorific value of carburetted complete gasification gas—415 B.Th.U. per cu.ft. at 60°F, 30″ Hg.

Mean calorific value of complete gasification gas—333 B.Th.U. per cu.ft.

Gas analysis.—CO_2, 5.1%; O_2, 0.2%; C_nH_m, 1.5%; CO, 30.7%; H_2, 48.2%; CH_4, 9.3%; N_2, 5.0%.

Coal used, dry, 44.40 lb. per 1,000 cu.ft.

Coal used, dry ash free, 41.04 lb. per 1,000 cu.ft.

Type of coal.—Comrie Doubles; volatile matter, 31.25%; carbon, 57,17%; ash, 6.5%; moisture, 5.08%; swelling index, 1-2; calorific value, 14,300 B.Th.U./lb. (gross dry).

Oil used, 0.859 gall. per 1,000 cu.ft.

Steam.—process steam, 43.0 lb. per 1,000 cu.ft.; surplus steam, 16.4 lb. per 1,000 cu.ft.

Tar produced, 0.511 gall. per 1,000 cu.ft.

Efficiency of gas production, 61.2%.

Overall efficiency, 68.2%.

Thermal yield from coal (only), 213.6 therms per ton (d.a.f.).

Operating cycle.—Blow, 65 seconds; purge, 10 seconds; up run oil, 40 seconds; up run, 30 seconds; down run, 75 seconds; up run purge, 10 seconds; total, 230 seconds.

Average temperatures.—Generator retort base, 855°C; generator top, 875°C; carburettor, 755°C; superheater, 705°C; waste heat boiler, 540°C.

Plant pressures.—Blast main, blow 23, up run oil 15; generator base, blow 22, uprun oil 22; generator top, blow 11, up run oil 22; carburettor, blow 8, up run oil 22; superheater, blow 5, up run oil 20; washbox outlet, blow 5, up run oil 18.

Larne Contract

The Larne Gas Company has placed an order with Tully Engineering Co., Ltd., for a new 200,000 cu.ft. per day oil carburetted Tully complete gasification plant. The new plant will include a standard mechanically operated Tully generator with dust interceptor/carburettor and washer scrubber, and will be used for base load operation, replacing the existing Tully complete gasification plants which have been in operation since 1931.

Scottish Western Jubilee

Fifty years ago this week, the 'GAS JOURNAL' published an editorial on the Scottish 'Juniors,' and in the same issue appeared the Presidential Address of the first President, Mr. James Lowe, and a paper on 'Gasworks Construction' by Mr. A. Smith of Tradeston. In the editorial we wrote: 'The Juniors must see that those who grasp the opportunities thus provided will be the best equipped men for taking part in the race for position in the gas industry. Influence may give a man a position; but influence will not keep him there. Deeds, work, action are required when responsibility is conferred; and results are the stubborn measure nowadays of a man's capacity. And a man's capacity may be largely moulded and developed by associating himself with, and participating in, the work of an active junior association.'

How true all this is was struck forcibly home as we looked round the august gathering which celebrated the jubilee of the Scottish Junior Gas Association (Western District) with a dinner held at Burlington House, Glasgow, last Friday evening.

The Scottish were actually the fourth 'Juniors' in date of formation; founders of the Western District having included Mr. George Braidwood and Mr. David Fulton. The former was unable to attend the function last week; but Mr. Fulton was there, and with all his old kindly and erudite oratory replied to the toast of the evening.

Among those present were over 20 past-presidents of the Association, and representatives of the Joint Council and all the other Junior Associations. Mr. Sidney Smith, Chairman of the East Midlands Gas Board (a past member of the Association), had travelled up from Leicester, and Mr. W. K. Tate, President, and Dr. W. T. K. Braunholtz, Secretary, of the Institution of Gas Engineers, from Portsmouth and London respectively.

Mr. George Royden, of Tradeston, is Jubilee President of the Association, and presided at the dinner. Mr. W. A. Green, Paisley, is Secretary.

Murdoch's Feeble Flame

The toast of the gas industry was proposed, in the unavoidable absence of Sir Patrick J. Dollan, by MR. T. B. NOBLE, M.A., who drew attention to the fact that as a result of William Murdoch's researches gas engineers were attending their gathering that night from Portsmouth in the south to Inverness in the north. People in New Zealand, Australia, South Africa, America, China and Japan —as Sir Frederick West had stressed the previous week when speaking in Dumbarton—had for many years enjoyed the boons and blessings of gas. The feeble flame lit by Murdoch had grown and spread until today it illumined the whole universe.

It was Dr. Johnson who said that the Irish were a very fair-minded race because they never spoke well of each other! Not so the Scots. They were proud to think that it was a Scot who had founded the gas industry and perhaps even more proud to know that from that day to this a steady stream of Scottish blood had been injected year after year into the industry south of the Border so that it might be sustained and refreshed!

The gas industry had travelled through the gates of private enterprise, along the road of undertakings owned by municipalities and corporations, and now had entered the wide field of nationalisation. It was undergoing a process of integration. The same process had been applied to other departments of our economy and was always accompanied by the danger of personal contacts being lost through the operation of a remote control, bound, in the nature of things, to be somewhat abstract and impersonal. There were those who suggested that nationalisation had brought a cold officialdom but he was satisfied that in Scotland, at least, the members of the Scottish Gas Board were determined not only to maintain a friendly and human relationship with all the people who served it, but also proposed, as one could see by the recent Dumbarton extensions, to add lustre, dignity, and efficiency to the industry in Scotland.

The industry had many problems to face. It was asked to produce good gas from bad coal. It had a coke problem, an educational problem, a recruitment problem the latter possibly caused because the financial rewards in the industry were too meagre. But given diligence, goodwill, co-operation, and a due appreciation of the fact that however important the gas industry was it had to realise it had to take its place and part in a co-ordinated national fuel policy, there was no limit to the extent to which it would develop. For the gas industry the best was still to come.

Mr. Tate Replies

MR. W. K. TATE, President of the Institution of Gas Engineers, replying, said that an address recently delivered in Aberdeen rather suggested that the gas engineer was not of much account! Nevertheless, certain salutary things had been said on that occasion. He was proud to have, for the first time, the opportunity of replying to the toast of the gas industry. There was no doubt that the industry had a notable part to play in our economy and it was up to them all—salesmen, administrators and everyone concerned—to maintain the service they had given and had enjoyed giving in the past. They had technique, knowledge and experience and should be able to give service.

Mr. Tate said that the industry was rapidly approaching the greatest revolution in gas manufacturing technique it had ever known. It would not be many years before they would gasify coal instead of carbonising it. It would mean a complete re-orientation of their approach to the branch of chemical engineering which they served. They were doing it on the Continent and he suggested that it would have to be done in Britain within the next 10 or 20 years. Their future depended on the gasification of coals which were almost a by-product of machine-mining. That was the way they would prosper. He was not forgetting the possibilities of natural gas but fundamentally Britain had to live on coal. They had therefore to be prepared to use what was available at a reasonable price, buying what nobody else wanted to purchase. They were on the verge of discoveries which would enable them to do that.

Mr. Tate said they had done and were doing other things. In the past 30 years they had increased the efficiency of the gas cooker by 40%. They had brought in all kinds of reforms with the one end in view, namely, to improve and increase the service to the consumer. They had suffered many blows. They succeeded in producing a farthing less per therm and found this cancelled by a rise of 7s. 6d. in the ton of coal. But they were strong enough to take these blows and to continue to serve the needs of the people. He brought warm greetings from the Institution and wished the Scottish (Western) Juniors all success.

'A Fine Spirit'

SIR ANDREW CLOW, Chairman of the Scottish Board, proposing the toast of the Association, recalled that 25 years ago there had been a semi-jubilee celebration at which the toast of the Association had been proposed by Mr. McLusky, of Glasgow, who had finished by saying:—'Problems and difficulties will present themselves; but I feel sure that the Association will continue its activities, so that when they meet to celebrate the Jubilee, they will be able to say that while it has doubled its age it has also increased its usefulness and activities many times.' That prophecy had been fulfilled. A distinguished ex-President had said to him 'Once a Junior, always a Junior.' That statement embodied a fine spirit and a great truth. Unless a man remained a junior he was not of much use. Education did not end at school or college because the whole of life should be regarded as an education. They should not abandon great traditions—they were often worth keeping. But nothing was more fatal to themselves and the industry than to decide that they had settled finally on what was to be done and that a change must be wrong. New ideas and new outlooks were a gift mostly in the keeping of the young and they should try to keep it alive.

New Ideas

The fact that new ideas were to be found in young minds was one reason why every administrator should welcome juniors and be ready to pick their brains. One of the best tests of good administration was the correct treatment of ideas which differed from one's own. A man who disliked opposing or varying opinions might get much done which he liked but he missed a great deal more. Those who were young should be able to contribute a fresh approach to their problems and a questioning and improving of established practice while those who were older could contribute experience, a useful asset in pursuing the art of understanding the people with whom they worked and the men and women they tried to serve.

Sir Andrew coupled the toast with the name of Mr. David Fulton, whose work

for education was well known and who had trained many young men who afterwards made their mark in the industry.

MR. DAVID FULTON, Helensburgh, acknowledging the toast, said that during the 50 years of its existence the Association had always kept before it the purpose for which it was formed—the furtherance of the education of the members by providing lectures, papers and visits to works and the furnishing of a forum for opinions and experiences. For speaking made the ready man and writing the exact man. It would be wrong to say that the Association had been completely successful in its aims. It had encountered two major wars, with all the attendant disruption of the lives of the younger men but any flickering of the flame had been merely a passing phase.

During the first decade the membership rose slowly to about 120 but the lack of numbers was compensated for by zeal and enthusiasm. Salary scales were then unknown, annual increments were most meagre, there was no expense sheet and assistant managers, to whom fame was the spur and who lived laborious days, were paid about £80 or £90 per annum. Yet they travelled hopefully and many of them arrived.

Mr. Fulton referred to the late Mr. Wilson of Glasgow, Mr. Ewing of Greenock, Mr. Blair of Helensburgh, Mr. Myers of Saltcoats, and others who had taken part in the early meetings. The first President was James Lowe, who went to Auckland, New Zealand, then assistant engineer and general manager in Glasgow, where his secretary was W. M. Mason, afterwards manager of the B.C.G.A. Mr. Lowe was succeeded by the late James Bell, whose memory would be kept green by the new works at Dumbarton. George Braidwood of Coatbridge was the second secretary and many of the first 12 Presidents were elevated to senior positions shortly after filling the chair. He himself had been connected with the Association as secretary or President from 1909 to 1916.

MR. FRANK HAILSTONES proposed the toast of the past Presidents, MR. JAMES DICKSON (Kirkintilloch) replying.

MR. JAMES CUBIE proposed 'Kindred Associations', the reply coming from MR. JOHN FORD (Inverness), President of the Scottish Gas Managers' Association. The toast of the guests was proposed by MR. COLIN CAMPBELL, Vice-President of the Association, MR. L. G. TOWNSEND, President, British Junior Gas Associations, responding.

TYNESIDE WINDOW DISPLAYS

The 'Puffer Age' display stressed that gas has a 'flair' for lighting fires.

Just under 11,000 people have left the 'Kettle Age' behind in the past few months.

Planning attractive showroom window displays to coincide with advertising these used by the Gas Council in the national Press proved successful in the window publicity of the showrooms of the Northern Gas Board (Tyneside Division). The window display relating to the 'Kettle Age' theme was so effective in orders that the display was retained in the windows much beyond the usual period. Later, a 'progress-report' display panel gave the day-to-day number of consumers during the past few months who had left the 'Kettle Age' behind by installing gas water heaters until the figure showed a total of 10,902.

To introduce a new scheme for the fitting of gas pokers, a theme on similar lines to that of the 'Kettle Age' has just been displayed, but with the slogan changed to 'Are you living in the "Puffer Age"?' To associate this display with the 'Puffer Age' a large charcoal sketch of Stephenson's 'Rocket' engine—the 'Puffing Billy' was shown, together with a cut-out model with extended cheeks endeavouring to blow a solid fuel fire into a blaze. An illuminated dummy fire with gas poker just being removed showed that 'Gas has a flair for lighting fires," a slogan that resulted in sales.

New C.U.C. Display

Stress was laid on the Government's nation-wide campaign to prevent old properties deteriorating beyond redemption by Mr. Harold Macmillan, the Minister for Housing and Local Government, speaking at the Building Centre, London, on September 30. He was opening the Coal Utilisation Council's new display and information centre which showcases many appliances which are being used by local authorities in 'Operation Rescue' schemes about the country.

Mr. Macmillan paid tribute to the Council's energetic Director, Mr. Eric Bellingham, who, he said, was apt to come into his room at the Ministry and say: "You are responsible for smog." Certainly, said Mr. Macmillan, he was anxious to see the installation of appliances which reduced or prevented smog, and this was one of the reasons why he regarded the Council as an ally and why he welcomed the opening of this new section.

Other speakers at the opening ceremony were Sir Hubert Houldsworth, Chairman of the National Coal Board, and Sir Giles Gilbert Scott, President of the Building Centre. The Minister was introduced by Sir John Charrington, Vice-President of the C.U.C., who spoke of the revolution in appliances and the increased production of improved solid fuel burning equipment in recent years.

The proof of this development was apparent in the new display which shows some of the latest types of improved fires, stoves, cookers and other domestic solid fuel burning appliances approved by the Ministry of Fuel and Power and recommended by the C.U.C. The appliances are well displayed in modern settings and include three models of the latest kind of free-standing open fires, which provide convection as well as radiant heating. There are also two free-standing openable stoves (one with a boiler), an inset openable stove with a convection chamber, a combination grate, a free-standing cooker with a boiler large enough to heat radiators, a heat storage cooker, two independent boilers with thermostatic control, two open fires with large back boilers, an automatic gravity feed boiler, and a down-draught convector fire. Samples of the wide range of recommended solid fuels for these appliances are also displayed.

GAS BOARD BUYS COMMERCIAL SHOW EXHIBIT

A new 3-ton Morris Commercial diesel engined normally controlled truck exhibited at the Commercial Motor Show was purchased by the North Western Gas Board and painted in the Board's livery. As soon as the show ended the truck went into service at Liverpool. A second model has been purchased for use at Oldham and, says Colonel W. Henry Slack, the Board's Transport Officer, 'If these two trucks meet all our requirements, we plan to order quite a few more.'

The truck has been fitted with the latest four cylinder overhead valve, 3.4 litre diesel engine which develops 58 b.h.p. at 2,400 revolutions per minute. In addition to an exceptionally good rate of fuel consumption, the engine has a lower compression rate than usual (16.5 to 1) which has minimised diesel knock.

NEW THOMAS GLOVER METER

Just 110 years ago Thomas Glover, newly arrived in London from Leith, perfected his now famous slide-valve and incorporated it into a new-type dry gas meter, the first of which was sold to the old Coventry Gas Company. Over the years which have elapsed since this revolutionary meter was introduced the Company founded by Thomas Glover has pioneered many of the re-

finements now accepted as standard in the high-efficiency gas meters of today. Latest addition to the range of meters produced by Thomas Glover & Co., Ltd., is the A.1, a meter of new and outstanding design in which are incorporated many further developments in meter construction including new type bosses which prevent distortion when installing the meter, and a new method of securing the diaphragms which prevents puckering during fitting and ensures identical and constant swept volumes.

The proved reliability of the tinned-steel outer case with soldered seam has led to its adoption for the A.1. Internally, the meter is of unit construction and is fitted with a pressure die-cast under-chamber, combining mechanical accuracy with absolute rigidity. To ensure smooth, well lubricated transmission the gear chamber is built into the under-chamber. Servicing the A.1 is an extremely simple operation. After unsoldering the top of the meter and removing only four screws and the index stuffing box, the metering unit can be lifted from the case and dismantled, using only a screwdriver.

Details of the meter, which is to D.1 specification, are as follows: The outer casing is of high quality charcoal-tinned plate made up from three sections—a pressed top and bottom and a folded unit which forms the four sides. Joints in the folded unit and the bottom are secured by lock seams and soldered. The top is soldered in position. The valve under-chamber is of pressure die-cast hiduminium alloy, chosen for its strength, homogeneity and resistance to corrosion. The valve gratings and covers are made to a special Thomas Glover formula which ensures a low co-efficient of friction in operation, excellent wearing qualities and freedom from corrosion.

The rectangular diaphragm pans are drawn from high quality charcoal-tinned plate and are assembled in units with the mounted diaphragms. The diaphragms are of Persian sheep skin, selected to ensure freedom from defects and flaws and having a uniform thickness of 0.45 mm. A new method of securing the diaphragm is used. The diaphragm is contained between two mounts around its periphery, the mounts being clamped between the flanges of the diaphragm pans which are in turn sealed by a specially formed aluminium band. This new method prevents puckering of the diaphragm during fitting and ensures identical and constant swept volumes. It is also a simple matter to unscrew a diaphragm pan assembly and install a new unit should this be required. All link bearings are fitted with stainless steel eyelets and bearings in the gear-chamber are of special anti-friction metal. The stuffing boxes are stuffed with felt wads, impregnated with a non-acidic grease. The index stuffing box can be removed as a complete unit without disturbing the index.

The top arms and valve arms are steel stampings cadmium plated. The top arms are bolted to the flag rods, and securely keyed, thus simplifying the setting operation. A substantial bottom bearing ensures the rigidity of the rod. The flags are formed in channel section from tinplate; jig drilled to ensure accurately aligned bearings. The bosses are machined from hot brass stampings. Connections are to I.G.E. D.1 specification. These bosses are of robust construction having a flat that locates against the side of the meter to prevent distortion when installing. The interior of the case is treated with a special anti-corrosive paint. Dimensions are:

	Cu. ft. per hour 100	200
Size of connections	¾ in.	1 in.
Width over outer edge of bosses	9 7/16 in.	9 3/4 in.
Width between centres of bosses	8 1/4 in.	8 3/4 in.
Width, side to side at base ..	7 1/8 in.	7 1/8 in.
Height, ground to boss face ..	12 in.	12 7/16 in.
Depth, back to front ..	7 1/16 in.	7 1/16 in.
Depth, back to front over bezel	8 1/2 in.	8 1/2 in.

COAL OFFICERS' MEETING

Before attending a meeting at the Bell Hotel, Leicester, on the following morning, coal officers from the area gas Boards and the Gas Council met at Nottingham on the afternoon of September 9, to pay a visit to Calverton Colliery (about seven miles from Nottingham). Here they inspected the coal preparation plant and lunched at the invitation of the National Coal Board, East Midlands Division. After lunch special facilities were provided for any officers who liked to descend the pit and visit the coal face.

The meeting was held on September 10, after which the coal officers were the guests of the East Midlands Gas Board for luncheon. In the afternoon the party were invited to tour the Aylestone Road gasworks, Leicester.

Smoke abatement experts of Edinburgh Public Health Department say the the worst offender is the domestic chimney. The experts, who are fighting to reduce the soot deposit that daily settles on the city, reveal that in one month 14 tons of soot fell on every square mile of one of three districts of Edinburgh where gauges have been installed to measure the soot deposit. Although this district get a mixture of industrial and domestic smoke, one of the others, which gets purely domestic smoke, sometimes has a higher soot deposit.

A Health Department spokesman says: 'The smoke from fireplaces is more harmful than factory smoke, and not so easy to control. In the industrial field, plants can be installed to help to prevent smoke. But such installations are too expensive for the home.'

The photograph shows, clockwise, E. W. Munn (South Eastern), V. G. Guest (Deputy Coal Officer, Gas Council), C. Johnson (Coal Officer, Gas Council), M. Barash (East Midlands), S. Black (Northern), C. Cairns (North Eastern), P. Valon-Bennett (Southern), A. Richards (Wales), S. J. Green (North Western), A. Gray (West Midlands), and J. M. Dunk (Eastern). Also present at the meeting but not on the photograph was W. L. Wright (South Western).

FAULTLESS PERFORMANCE

As the ballerina's faultless performance and flawless appearance delight her critical audience, so the faultless performance and flawless appearance of the Century Cooker delight the critical housewife . . . as the ballerina's perfect dancing is the result of years of training and practice, so the Century is the result of R. & A. Main's years of experiment and research.

Always to the forefront in improving the efficiency of the gas cooker, R. & A. Main Ltd. have been " first in the field " with many outstanding features . . . in 1922 Main introduced the simplified form of cooker construction . . . in 1927 Main were first with an all-enamelled cooker . . . and in 1935 Main introduced the first all-sheet metal cooker.

The No. 20 Cooker was the first chassis-less model to be produced and marketed in Britain, and it was also the first cooker to incorporate an oven-flue vent discharging in front of the backplate. The high efficiency and popularity of the Century has indeed proved the worth of Main's years of constant research.

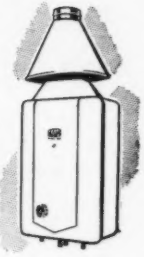
MAIN No. 20 CENTURY GAS COOKER

C4

Note the name-made by MAIN

R. & A. MAIN LIMITED
LONDON and FALKIRK

there is a MAIN water heater for every domestic purpose . . .



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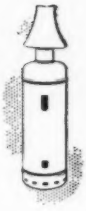

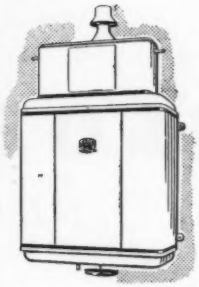

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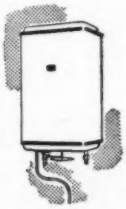

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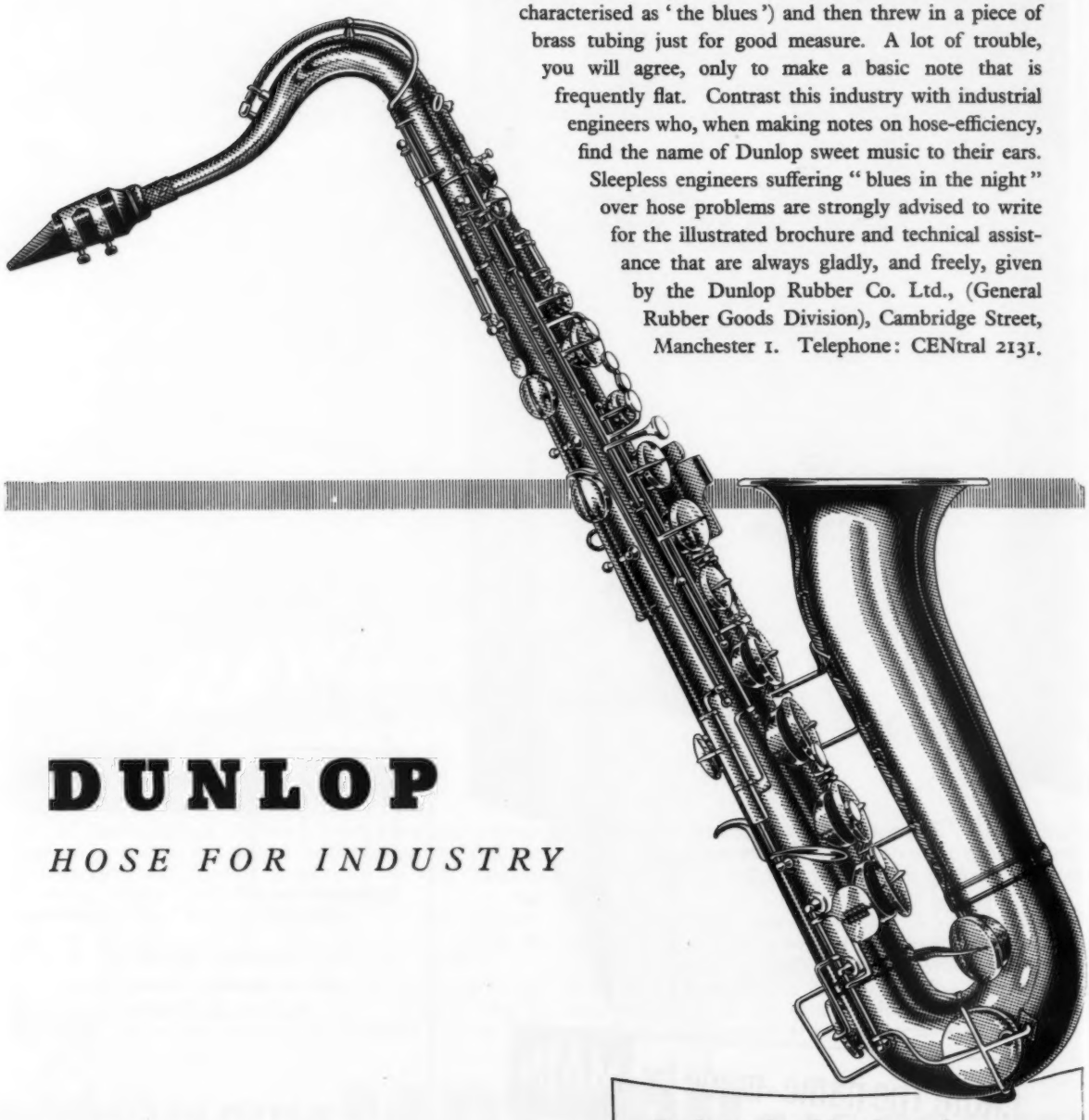
saxophone soliloquy

Adolphe Sax certainly started something. To make this hybrid he married the conical tube of an oboe to the reed from a clarinet, added a pinch of "je ne sais quoi" (later to be characterised as 'the blues') and then threw in a piece of brass tubing just for good measure. A lot of trouble, you will agree, only to make a basic note that is frequently flat. Contrast this industry with industrial engineers who, when making notes on hose-efficiency, find the name of Dunlop sweet music to their ears. Sleepless engineers suffering "blues in the night" over hose problems are strongly advised to write for the illustrated brochure and technical assistance that are always gladly, and freely, given by the Dunlop Rubber Co. Ltd., (General Rubber Goods Division), Cambridge Street, Manchester 1. Telephone: CENtral 2131.



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NEWS IN BRIEF

The Burning of Smokeless Fuel is to e a condition of tenancy at a new ousing area in Gracemount, Edinburgh, here between 1,300 and 1,400 houses re being built by the Corporation.

The 20th Building Trades Exhibition is be held at the City Hall, Deansgate, Manchester, from October 19 until Octoer 30. The North Western Gas Board to exhibit gas-heated appliances and ethods of installation. Other exhibiors will include Ideal Boilers and adiators, Ltd., and the Solid Smokeless uels Federation.

The New Headquarters of the Junior nstitution of Engineers at 14, Rochester Row, Westminster, S.W.1, were officially pened by Viscount Falmouth, who was President 1940-41, on September 23. On he following day Mr. D. Keith Lucas, B.A., delivered the 11th Gustave Memorial Lecture. The lecture was entitled 'Some of the Problems of Bomber Design.'

A Financial Times correspondent reports that considerable quantities of coke are said to have been contracted to Luxembourg and French consumers under the West German reduced export price scheme. With coke dumps still over 3.5 mill. tons, however, leading coal firms are doubtful whether the present scope of the scheme will be sufficient to dispose of the hoped-for quantity of one mill. tons by March, 1955.

Arrangements Have Been Completed to hold for the first time in the United Kingdom a joint exhibition of chemical plant and petroleum equipment. This exhibition will be known as the Chemical and Petroleum Engineering Exhibition and will take place in the Grand Hall, Olympia, London, in June, 1958; it will be organised by F. W. Bridges and Sons, Ltd., and sponsored jointly by the British Chemical Plant Manufacturers' Association and the Council of British Manufacturers of Petroleum Equipment.

Belfast Gas Committee is to seek a loan from the Ministry of Health and Local Government for £200,000, to be spent on development in the current financial year. The Committee was told that the major portion would be required for providing mains, services, and meters for new housing, and the remainder for extending and improving supplies to existing consumers. The Committee recorded its appreciation of the services of Mr. Albert E. Thompson, chief inspector of the meter section, who retired on September 30. He had been with the Department for 50 years.

Women's Gas Federation.—Dame Vera Laughton Mathews, National President of the Women's Gas Federation, opened the inaugural meeting of the Scarborough branch of the Women's Gas Federation in the Gas Showrooms, Westborough, on September 21. Mr. N. C. Sturrock, General Manager for York, Harrogate, and Scarborough gas undertakings, welcomed members and promised the group's support for the new branch. It was agreed that meetings should be held on the third Tuesday in every month. Mrs. D. M. Haigh presided, and accepted an invitation to become Chairman until the branch's first annual general meeting in January.

Presenting Certificates of the Royal Society for the Prevention of Accidents, won by drivers of the Truro, Penzance and Newquay districts of the South Western Gas Board, the Mayor of Truro (Mr. L. A. Hoskins) said that in the Plymouth and Cornwall Division of the Board 135 vehicles were operating with an annual total mileage of over 1 mill. Out of 102 drivers 85 had been successful in gaining certificates, and the Mayor made presentations to the following: Messrs. Davey (St. Austell), Freeman (St. Ives), Oates (Redruth), Potter (Penzance), Rickard (Newquay), Roach (Wadebridge), Roberts, Verran and Minors (Truro).

The Value of domestic gas and coke appliances sold by the North Western Gas Board during August was £425,539, the highest total for any summer month since the Board was established in 1949. Compared with 1953, August sales were up by 32% and July sales, at £407,842, were up by 30%. Total sales in the five months April to August, at £1,860,505, were up by 28% compared with sales in the same period of 1953. These increases are attributed partly to the abolition of restrictions on hire-purchase of appliances, of which the final stage took place on July 14, and partly to special measures taken by the Board to stimulate intensive selling.

Telcon.—The Telegraph Construction and Maintenance Co., Ltd., Telcon Works, Greenwich, announces the opening of a new branch office and depot at 2, St. Nicholas Buildings, Newcastle-on-Tyne, 1, under the management of Mr. R. Fenwick. Stocks are carried of P.V.C. wiring cables and flexibles, radio frequency and broadcast relay types of cables. The branch also handles enquiries for other Telcon products, including paper insulated mains cables, having copper or aluminium conductors and with either lead or aluminium sheathing, and products of Telcon's Plastics Division. The company also announces the opening of a London sales office at Norfolk House, St. James's Square, S.W.1. under the management of Mr. A. W. Matkin.

Anglers from many parts of the Cambridge Division of the Eastern Gas Board met at Bottisham on September 26 for the annual fishing match. Teams representing Cambridge, Bedford, Peterborough, Wisbech and a combined team from Bedford and Huntingdon took part. The total weight caught was 70½ lb. and Bedford and District were the winners with a bag of 30 lb. 14 oz. 7 drams. Second was the Peterborough team, followed by Bedford, Cambridge, and Wisbech in that order. After the match the teams were entertained to tea at the Cambridge Gas Employees' Recreation Club, when the awards were distributed by Mr. E. H. Winch (Divisional Engineer) who is also a vice-president of the club.

Smith Meters Visited

A party of 45 members of the South Eastern Gas Board Discussion Group, Kent County Division ,visited Smith Meters, Ltd., on September 15. They spent the morning making a complete tour of the Kennington works and seeing the assembly of domestic and industrial meters. A short visit was also paid to the Ministry of Fuel and Power testing station. The visitors were then taken by coach to Rowan Road works, Streatham, where lunch was served, followed by a tour of the Streatham works. Here was shown the manufacture of gas meter parts and sub-assembly.

At the completion of the tour Mr. Norman Smith, Chairman of Smith Meters Ltd., addressed Mr. J. D. C. Woodall, Sales and Service Manager of the South Eastern Gas Board, Kent County Division, and his colleagues, saying how delighted he was that members of the Group had had this opportunity of seeing over the works and being able to see the complete process involved.

Mr. Woodall expressed his thanks to Mr. Norman Smith and his co-directors and staff for the interesting day, and thanked, too, the guides for their untiring attention.

Diary

Oct. 7.—NORTH WESTERN G.C.C.: Partington Gasworks, 12 noon.

Oct. 8.—MANCHESTER SECTION, I.G.E.: Visit to Clayton, Son & Co., Ltd., Leeds.

Oct. 9.—SCOTTISH (EASTERN) JUNIORS: Presidential Address by D. C. Elgin.

Oct. 12.—LONDON AND SOUTHERN SECTION, I.G.E.: Fourth Annual General Meeting. 'Obiter Dicta,' E. G. Stewart, 17, Grosvenor Crescent, S.W.1. 2.40 p.m.

Oct. 15.—LONDON JUNIORS: Presidential Address, E. W. B. Dunning, North Thames Gas Board Showrooms, Edgware Road, 6.30 a.m.

Oct. 15.—MIDLAND SECTION, I.G.E.: Autumn Meeting, 'Breeze Burning for Steam Raising,' C. H. G. Hayward, General Manager, Stoker Works, Edwin Danks & Co., Ltd., Victoria Hotel, Wolverhampton, 11 a.m.

Oct. 15.—SCOTTISH JUNIORS (WESTERN): 'Some Aspects of Gasification,' W. L. Balmer; 'The Value of Experience in The Retort House,' J. Bostock; 522, Sauchihall Street, Glasgow, 6 p.m.

Oct. 16.—YORKSHIRE JUNIORS: Annual General Meeting. Address by A. McDonald, Bridge Street, Leeds.

Oct. 19.—SOCIETY OF CHEMICAL INDUSTRY (CHEMICAL ENGINEERING GROUP): Film, 'Corrosion in Action', Burlington House, Piccadilly, London, W.1.

Oct. 20.—SOUTH WESTERN SECTION, I.G.E.: Annual General Meeting, Bristol.

Oct. 21.—MIDLAND JUNIORS. Day visit to the works of Walker, Crosweller Co., Ltd., Cheltenham.

Oct. 21.—NORTH OF ENGLAND SECTION, I.G.E.; Joint visit with Northern Juniors to new Fishburn coke oven plant. Paper, 'Methane Drainage', by R. Richardson and J. G. Pope.

Oct. 23.—MANCHESTER JUNIORS: Annual General Meeting and President's Day, Stretford Works.

Oct. 28.—NORTH THAMES G.C.C.: Westminster City Hall, 2.30 p.m.

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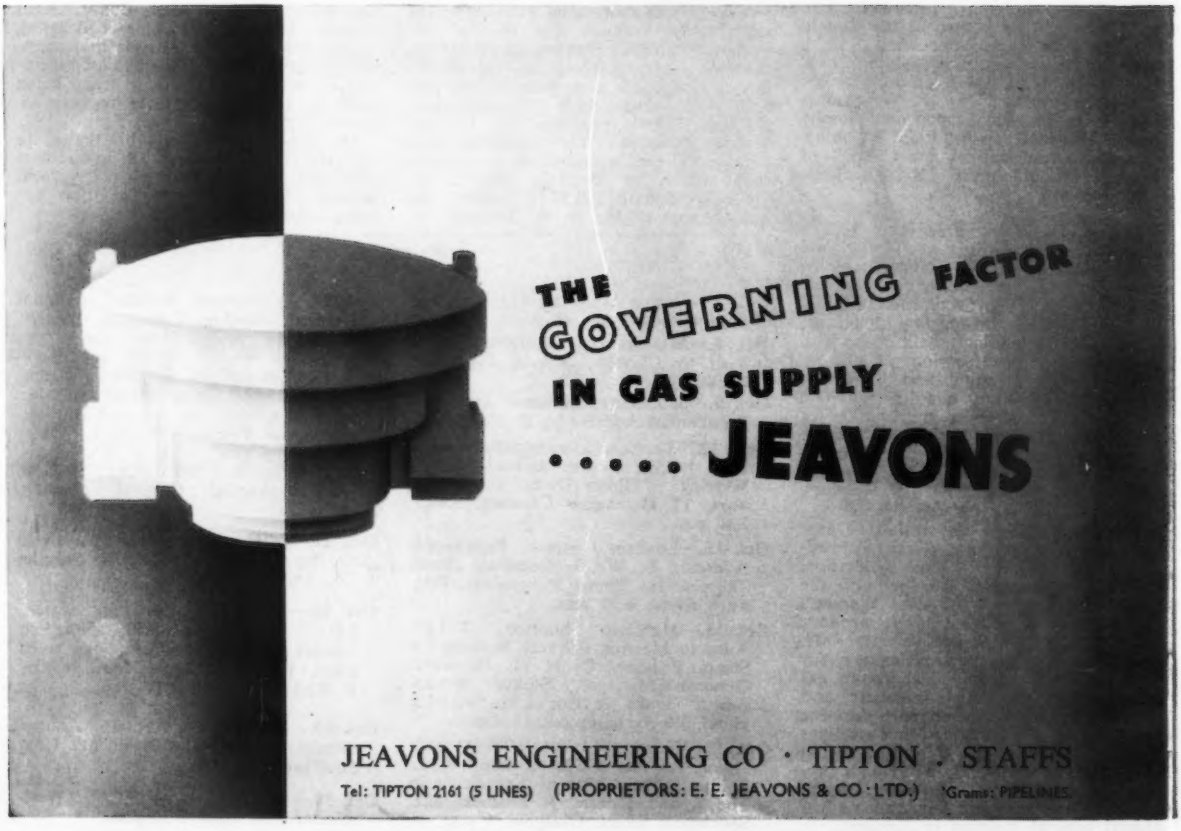
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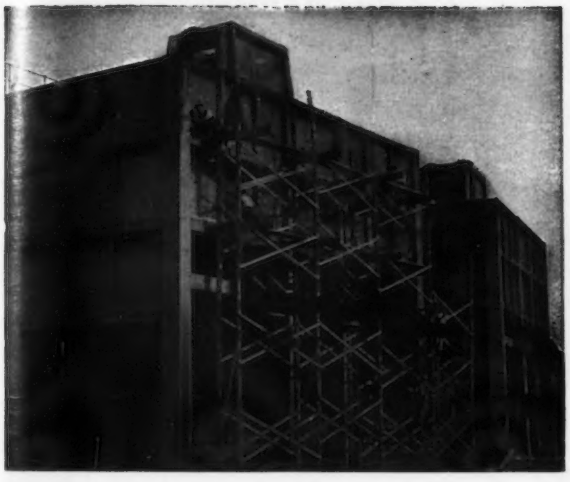

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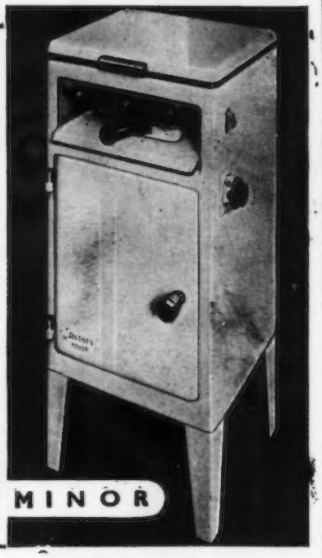

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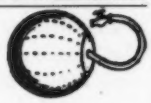

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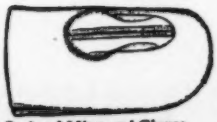

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Subscription Rates: Home and Empire:—**52**/– per annum; Foreign:—**60**/– per annum. (Both payable in advance.) A copy of the " Gas Journal " Calendar & Directory is presented each year to continuous subscribers.

Classified Advertisements: All small classified advertisements are charged at **1/9** per line (approx. **7** words)—minimum charge **10/6**. A Box Number address occupies **2** lines, and a further **6d.** is charged towards cost of postage on replies. Copy must be received by first post on Monday to ensure insertion in that week's Journal.

Displayed Advertisements: Rates obtainable on application to the Business Manager. Change of copy for displayed spaces must be received **14** days prior to publication if proofs are required. Type area of inside pages **10** in. deep × **7** in. wide; block screen **120**.

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MIDLANDS MANAGER: G. B. Torrance, 42, Wychall Lane, King's Norton, Birmingham, 30. *Telephone:* Kings Norton 3868

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Name.....

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THE COOKER CLEANER
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APPOINTMENTS VACANT

The engagement of persons answering these advertisements must be made through a Local Office of the Ministry of Labour or a Scheduled Employment Agency if the applicant is a man aged 18-64 inclusive or a woman aged 18-59 inclusive unless he or she, or the employment, is excepted from the provisions of the Notification of Vacancies Order, 1952.

SOUTH WESTERN GAS BOARD

CHELTENHAM DIVISION
JUNIOR TECHNICAL ASSISTANT

APPLICATIONS are invited for the above appointment at the Stroud Works.

Salary will be in accordance with Grade A.P.T. II, £320-£460 per annum.

Candidates should have some knowledge and experience of gas manufacture.

Successful applicants will be required to pass a medical examination and join the Board's Staff Pension scheme, if eligible.

Applications stating age, education, etc., should be received by the undersigned not later than October 13, 1954.

O. H. W. BOONHAM,
Production Engineer.

South Western Gas Board,
Gas Works,
Cheltenham.

WALES GAS BOARD

INDUSTRIAL GAS DEVELOPMENT CENTRE, CARDIFF

APPLICATIONS are invited for the appointment of ASSISTANT INDUSTRIAL GAS ENGINEER within the salary range of A.P.T. Grade XA (£690/£790 per annum).

Applicants should have had experience in the design, construction and installation of industrial and commercial equipment and should possess a Higher Grade Certificate (Supply) of the Institution of Gas Engineers or equivalent qualification.

The successful applicant will be required to pass a medical examination, and to subscribe to such scheme of superannuation that the Board may adopt.

Applications, stating age, qualifications and experience, together with the names of two referees, should be received by the undersigned not later than October 12, 1954.

C. B. MAWER,
Secretary.

2, Windsor Place,
Cardiff.

WALES GAS BOARD

NEWPORT UNDERTAKING
ASSISTANT SECRETARY

APPLICATIONS are invited for the post of ASSISTANT SECRETARY, whose duties would be those of Chief Assistant to the Secretary, who is also Group Accountant and Group Convenor.

Candidates should possess a Secretarial and/or Accountancy qualification, and be fully experienced in gas accounting, including all subsidiary records and final accounts; mechanised accounting, including billing, wages, stores and nominal ledger; office organisation and control of staff.

The salary will be in accordance with Grade A.P.T. XII, Provincial 'A', £765-£890.

The successful candidate will be required to pass a medical examination and to join the Board's Superannuation Scheme.

Applications stating age, qualifications and experience, together with the names of two referees, should reach the undersigned not later than ten days after the appearance of this advertisement.

J. F. RUST,
General Manager and Engineer.

Gas Offices,
Mill Street,
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MANAGER required for 25 million Works in Eire. Salary according to ability. Applications giving full details to G. Anderson, Limited, 11 Merrion Square, Dublin.

NORTH WESTERN GAS BOARD

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Applicants must hold the City and Guilds Full Technological Certificate in "Gas Fitting."

J.I.C. Schedule rates of pay (at present 3s. 9½d. per hour).

Applications to be received by the Personnel Officer, Fylde Group, North Western Gas Board, Princess St., Blackpool, not later than Friday, October 15, 1954.

EAST MIDLANDS GAS BOARD

LEICESTER AND NORTHANTS. DIVISION
TECHNICAL ASSISTANT (DISTRIBUTION)—NORTHAMPTON GROUP

APPLICATIONS are invited for the position of TECHNICAL ASSISTANT to the Group Distribution Engineer at Northampton.

Applicants must at least hold the Ordinary Grade Certificate in Gas Engineering (Supply), should have a thorough knowledge of modern methods of distribution, including high and low pressure systems, and be capable of carrying out the detail work in connection with the planning and estimating of new work.

The commencing salary will be within Grades A.P.T. V/VI of the National Salary Scales (min. £480, max. £590) according to age and experience.

The post is pensionable and the successful applicant may be required to pass a medical examination.

Applications, stating age and experience and giving full details of training and qualifications, together with the names of two referees, should be addressed to arrive not later than Tuesday, October 12, 1954.

H. B. TAYLOR,
Divisional General Manager.

Millstone Lane,
Leicester.
September 25, 1954.

NORTH EASTERN GAS BOARD

BRADFORD GROUP
TECHNICAL ASSISTANT (DISTRIBUTION)

APPLICATIONS are invited from suitably qualified persons for the position of TECHNICAL ASSISTANT (DISTRIBUTION) Bradford District.

The salary will be within Grade A.P.T. VII (Provincial 'A') (£585-£665 per annum) of the scales agreed by the National Joint Council for Gas Staffs. The commencing salary will depend on qualifications and experience.

Candidates should hold the Higher Grade Certificate in Gas Engineering (Supply) of the Institution of Gas Engineers or an equivalent qualification. In addition they should have a working knowledge of both high and low pressure distribution systems and should be able, or prepared to learn to drive a car.

The successful applicant will be required to pass a medical examination and to participate in the Board's Staff Pension Scheme.

Applications giving full details of age, experience and qualifications, should be forwarded to the Group General Manager, North Eastern Gas Board, Bradford Group, Britannia House, Bradford, to be received not later than October 25, 1954.

J. C. GARDNER,
Secretary.

Bridge Street,
Leeds, 2.
October 1, 1954.

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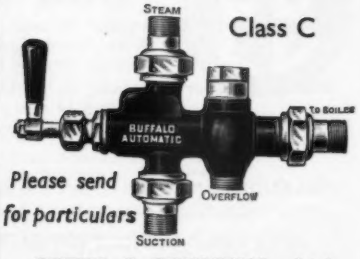
BUFFALO INJECTORS



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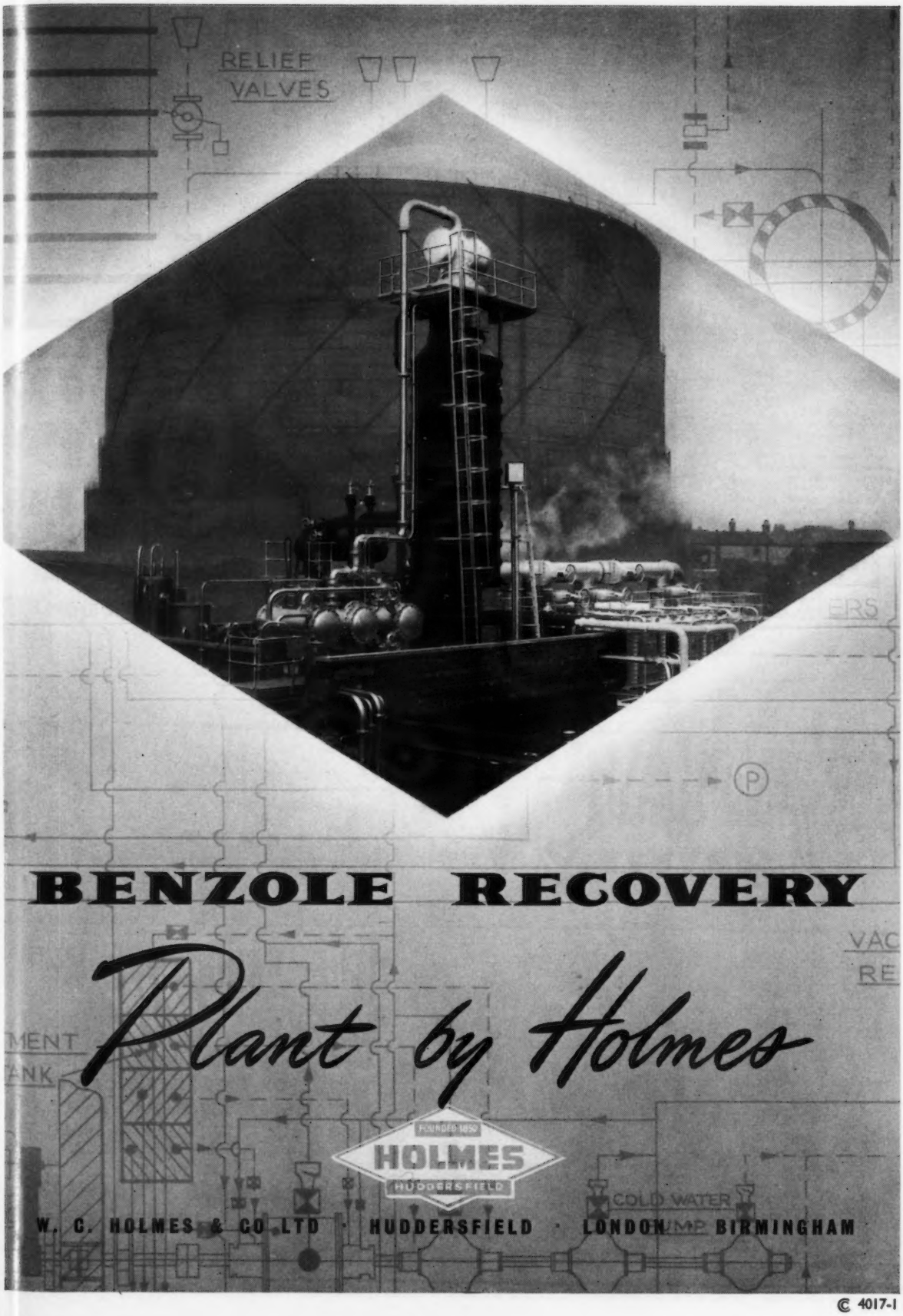
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industrial gas compressors

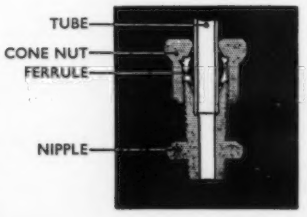
FOR COMPRESSING AIR OR GAS SUPPLIES USED FOR FURNACE HEATING, METAL MELTING, BRAZING, SOLDERING BITS, LAUNDRY IRONS, ETC.

DIRECT COUPLED COMPRESSORS (see illustration right) are fitted with automatic internal by-pass valves and lubrication systems. They are direct coupled to Keith Blackman motors. Type OA compressors in this range occupy a floor space of only 18" x 7½".
CAPACITY RANGE: 100 to 750 cub. ft. of gas or air per hour at 3 lbs. per sq. in. pressure.

TYPE 4 COMPRESSORS (not illustrated) are also fitted with automatic internal by-pass valves and lubricators. The complete unit includes motor and drive on a common bedplate, all of Keith Blackman manufacture.
CAPACITY RANGE: 500 to 20,000 cub. ft. of gas or air per hour at 3-5 lbs. per sq. in. pressure.
AREA OCCUPIED: from 9¼" x 16½" to 61" x 27".

DID YOU KNOW?

KEITH BLACKMAN have been making compression joints for many years and the present design embodies features developed as a result of this long experience. *Notice that the shape of the ferrule is such that the joint is made without unduly stressing the tube.*



serving to burn

Note: the four burner heads (right) are for high pressure gas, or low pressure gas and air blast.

LEFT: "Fishtail" type burner with two-armed stamped pattern injector for heating liquid in tanks by submerged combustion tubes. For use with low pressure gas supplies. ***Size Range:*** 1", 1¼", 1½", 2" and 2½" outlets. ***Capacity Range:*** 45-280 cub. ft. of gas per hour.

Brass non-blow-off head types: deal with 5 to 10 cub. ft. of gas per hour.

Stainless steel, "F" type head, burner: deals with 8 cub. ft. of gas per hour.

Perforated head type burner: deals with 10 to 15 cub. ft. of gas per hour.

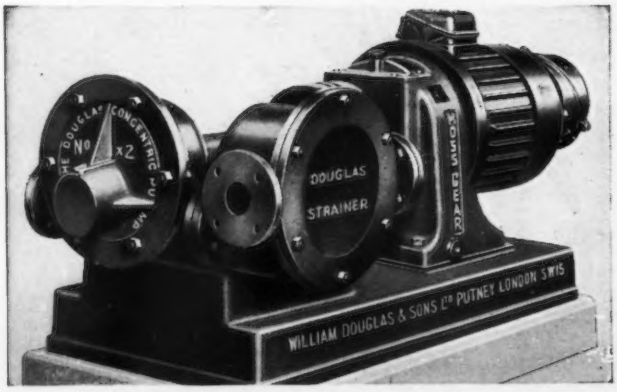
Keith Blackman LIMITED
MILL MEAD ROAD, TOTTENHAM, LONDON, N.17
BRANCH OFFICES AT MANCHESTER, BIRMINGHAM, LEEDS, GLASGOW, NEWCASTLE-ON-TYNE, PENARTH near CARDIFF, AND BELFAST

INDUSTRIAL GAS EQUIPMENT

524

AMAL

Calibrated Jets & Injectors
to meet a specification of consumption
A1
AMAL LTD., HOLDFORD ROAD, WITTON, BIRMINGHAM, 6



"THE DOUGLAS PUMP"

SHEWN FITTED WITH SUCTION PIPE LINE STRAINER, GIVING CHOICE OF TWO SUCTION LINES, PUMP & STRAINER STEAM HEATED. GOOD SUCTION. SLOW SPEED.

WILLIAM DOUGLAS & SONS LTD., PUTNEY - - LONDON, S.W.15.

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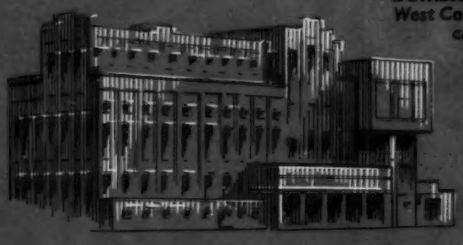
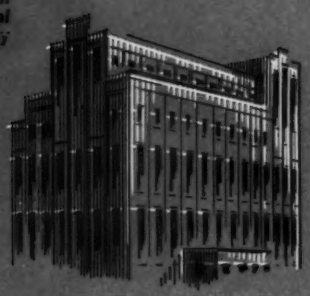


DUMBARTON. Installation of 64 50-inch Glover-West Continuous Vertical Retorts. Nominal daily capacity of 5,760,000 cu. ft of gas.

STOCKTON-ON-TEES. 64 50-inch retorts. Nominal daily capacity 5,760,000 cu. ft.

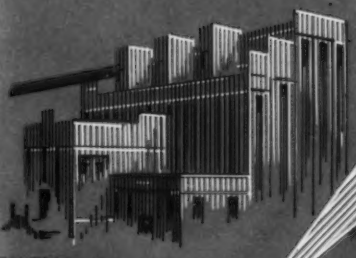


North

East

South

In common with Glover-West plants throughout the country, these four major installations, recently put into operation, incorporate the "Balanced Heated" setting, a feature of the Glover-West system which has substantially reduced the amount of fuel required for the carbonization process.



SALFORD. Extension of 24 50-inch retorts to existing 48 retorts. Total daily capacity 6,480,000 cu. ft.

BROMLEY-BY-BOW. 120 40-inch retorts. Total daily capacity 6,500,000 cu. ft.

WEST

'BALANCED HEATING' saves fuel

WEST'S GAS IMPROVEMENT CO. LTD

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B

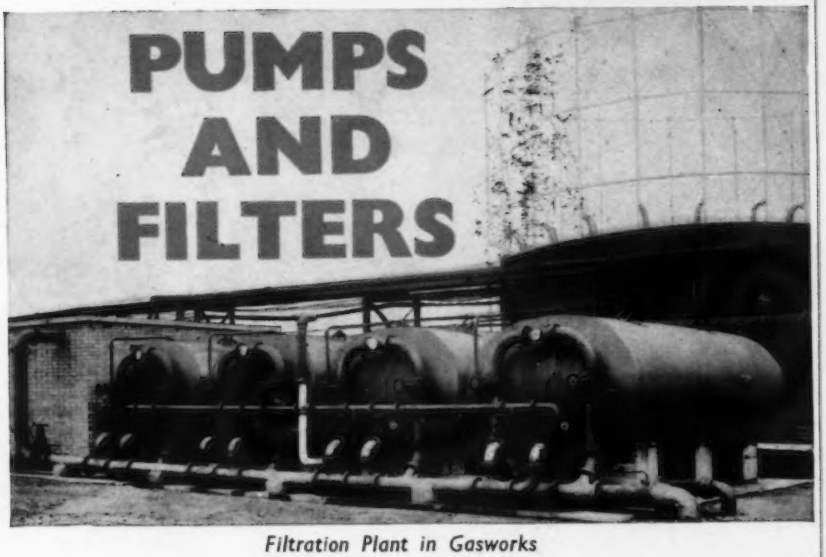
Pulsometer Engineering

IN ASSOCIATION WITH Joseph Evans

NINE ELMS IRONWORKS · READING

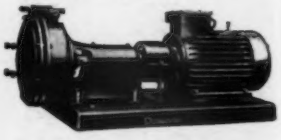
CULWELL WORKS · WOLVERHAMPTON

PUMPS AND FILTERS

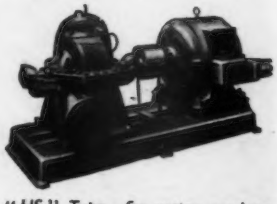


Filtration Plant in Gasworks

Rotary pump for Oil transfer duties

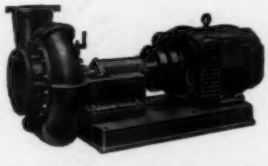


Stoneware pump for Corrosive and chemicals



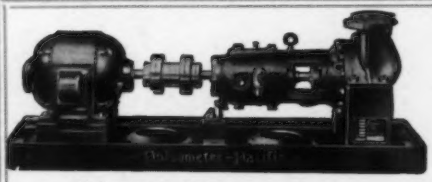
"HS" Type—for water services. All heads up to 500 feet.

The illustrations show centrifugal pumps for light and heavy oil and liquor duties, stoneware and special metal pumps for handling acids and alkalis, pumps for circulating and washer duties, for clean water and fire services and for liquids containing abrasives.

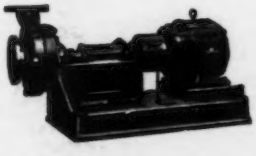


Slurry pump for coal washing and abrasive liquids.

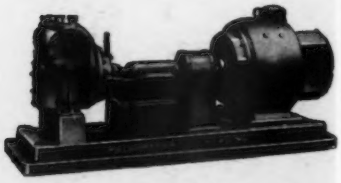
Reciprocating pump of modern design for Gas Works.



Pulsometer—Pacific type, based on latest American practice.



"JA" & "JB" types for high temperature water circulation.



Self priming centrifugal pumps.

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